GREATER TORONTO AREA

3Rs ANALYSIS

EA INPUT DOCUMENT

FINAL - MAY 1994

Ontario

Ministry of Environment and Energy

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Fiscal Planning and Information Management Branch
Ministry of Environment and Energy

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EXECUTIVE SUMMARY

Background and Purpose

With the introduction of the Waste Management Act (WMA), 1992 by the Province of Ontario, the Interim Waste Authority (IWA) was empowered to conduct environmental assessments (EAs) to locate three landfill sites in the Greater Toronto Area (GTA). These three landfill sites will provide waste disposal capacity to Metro Toronto and the Regions of Durham, York and Peel, for at least 20 years. The Region of Halton recently completed a landfill site selection process and was not included in the IWA EAs.

The WMA also directs the Minister of Environment and Energy to provide to the IWA waste diversion estimates for use in the IWA EAs. These estimates were provided by the Minister in May 1992.

The GTA 3Rs Analysis provides analytical support to waste diversion estimates provided, and also serves to identify and evaluate alternative 3Rs systems (comprised of combinations of 3Rs programs, technologies and practices) that could reasonably be implemented in the GTA. The potential for each 3Rs system identified to divert waste over the 20-year minimum life expectancy of the GTA landfills is also determined.

Study Approach Overview

An array of conceptually different 3Rs systems was identified for addressing residential wastes, as well as for institutional, commercial and industrial (IC&I) wastes. Including the Existing and Existing/Committed system, six residential and six IC&I 3Rs systems were developed from the available 3Rs components:

Residential		***IC&I***	
System 1	*Existing*	*System 1*	*Existing*
2	*Existing/Committed*	*2*	*Existing/Committed*
3	*Direct Cost*	*3*	*Extended 3Rs Regulations*
4	*Expanded Blue Box*	*4*	*Expanded 3Rs Regulations*
5	*Wet/Dry*	*5*	*Expanded 3Rs Regulations with Organics*
6	*Mixed Waste Processing*	*6*	*No Unprocessed Waste to Landfill*

The number of potential systems which could be developed from combinations of system components is very large. The systems which were developed were those considered to be reasonable for implementation in the GTA. There were no systems considered which were deemed impractical or unreasonable. In addition to the system combination possibilities,

there is a wide menu of "enhancement" components which can be drawn upon to improve the performance of any given system.

The residential systems were developed specific to the four municipalities of the GTA whereas the IC&I 3Rs systems were applied to the GTA as a whole. This study did not attempt to develop an optimal system for each service area as that would require site-specific analysis and policy considerations beyond the scope of this study.

An evaluation, done at a non-site specific, generic level, identified the advantages and disadvantages to the environment of each potential 3Rs system. The evaluation was based on the following criteria groups:

- *Cost;*
- *Municipal Finance;*
- *Natural Environment;*
- *Service; and*
- *Social Environment.*

The systems were then ranked from lowest impact to highest impact by each criteria group.

Consultation

A public/agency consultation program is being undertaken as part of the GTA 3Rs Analysis. The consultation program is being conducted in three stages. The first stage occurred through June to December 1992 and involved MOEE Waste Reduction Office (WRO) staff attending the IWA information centre when the long list of candidate landfill sites was announced.

Stage 2 occurred from December 1992 to October 1993 and focused on the review of past consultation efforts dealing with waste management issues in the GTA. It also involved reviewing comments on 3Rs issues obtained through the IWA consultation activities.

Stage 3 occurred from November 1993 to March 1994 and was centred on public/agency review of the draft GTA 3Rs documentation. Comments received were considered in the preparation of this final document.

Conclusions

This document provides written estimates on the amount of waste that will not be generated due to waste reduction efforts and the amount of waste which will be diverted

from disposal due to reuse or recycling efforts. It should be noted that the estimated diversion percentages are the cumulative diversion achieved over a 20-year period, from 1996 to 2015.

The disposal requirements for each service area depend on which residential and IC&I systems are combined to form any waste diversion system. The residential and IC&I 3Rs systems evaluated can be combined 25 different ways for each service area.

The estimates of waste diversion for the three service areas show that of the 25 combinations considered for each service area, 16 have the ability to divert 50% or more of the generated waste stream in the 20-year period between 1996 and 2015.

The analysis shows that the written estimates provided by the Minister of Environment and Energy to the IWA in May 1992 fall within the range of diversion reasonably achievable by a number of combinations of residential and IC&I systems within each of the service areas.

The systems presented and evaluated were not designed as plans for any of the Regions or service areas. They were chosen to estimate the impacts of a number of different possible approaches to waste diversion. They are not considered a complete list of all the possible combinations of components which could form waste diversion systems, and a comprehensive mix and match of components has not been attempted. The systems were chosen to provide a reasonable range of diversion options, and to estimate the impacts of these options.

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1.0 INTRODUCTION

1.1 Background

In 1989, the government of Ontario announced its commitment to meeting a Provincial target of at least 50% reduction of waste going to landfills and incineration by the year 2000. This target, a waste diversion target to be achieved through waste reduction, reuse and recycling (the 3Rs), was confirmed by the present government in 1990.

To facilitate the achievement of the 50% target, the Province introduced the *Waste Management Act*, 1992. The Act broadens the government's powers to reduce waste sent to disposal through a variety of means. It also vests powers in the Interim Waste Authority (IWA), an agency created to ease the waste disposal crisis in the Greater Toronto Area (GTA). The IWA is complying with its mandate by conducting environmental assessments to locate three long-term landfill sites in the GTA.

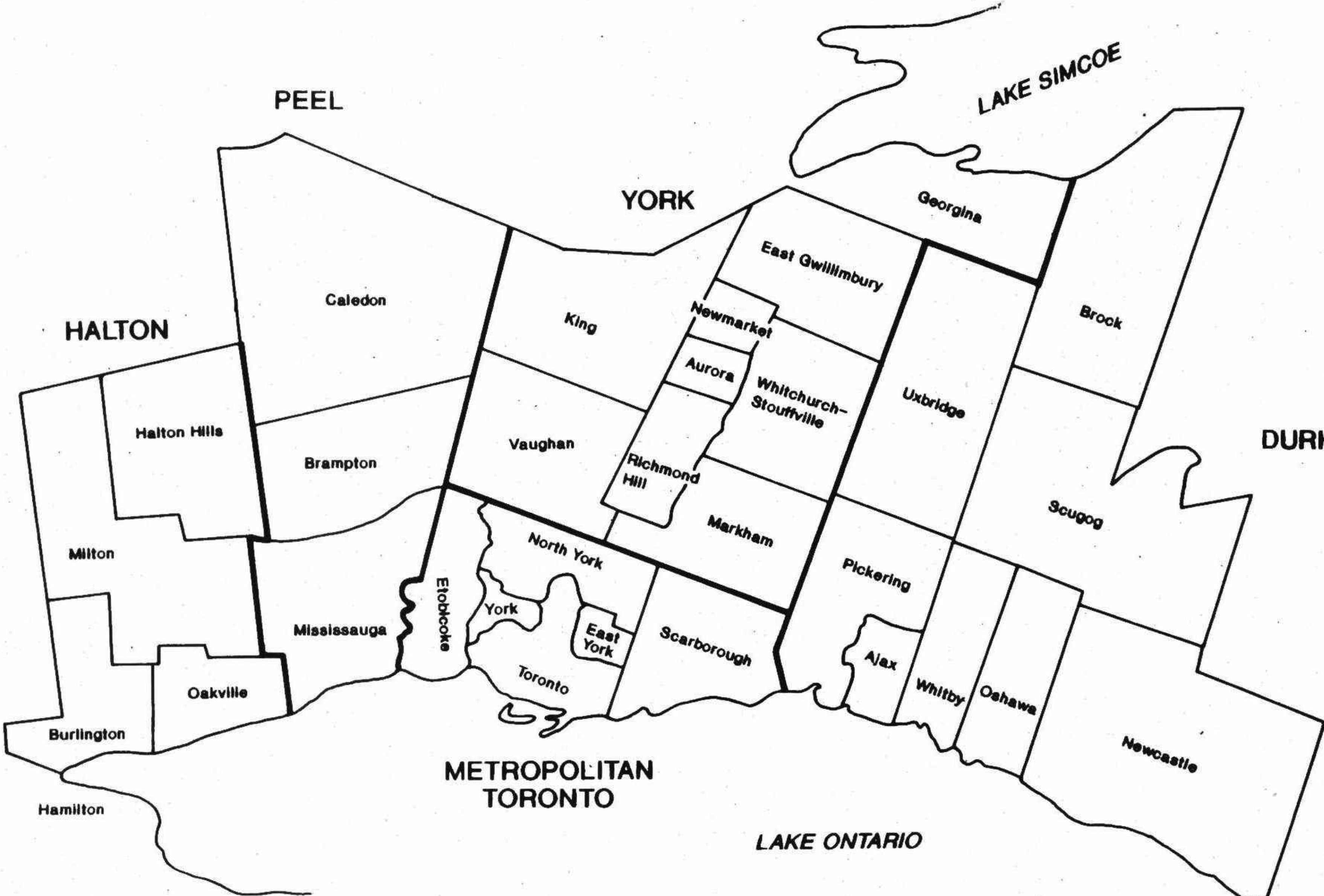
The GTA Regional Municipalities of Peel and Durham are each defined for the IWA process as separate "primary service areas". Metro Toronto and the Regional Municipality of York have been defined as a separate combined primary service area. Each of the three defined primary service areas is proposed to receive one new landfill facility identified through the IWA's process. The fifth GTA Regional Municipality, Halton, has already obtained approval for a landfill site and thus is not part of the present siting process. Figure 1.1 illustrates the municipal boundaries of the GTA.

1.2 Purpose of Study

This study has two purposes, each of which relates directly to a requirement created by the *Waste Management Act.*

The first requirement pertains to waste estimates. Section 14 of the *Waste Management Act* requires the Minister of Environment and Energy to provide a written estimate as to:

a) *the amount of waste that would otherwise be expected to be generated in the primary service area (i.e. each of Peel, Durham and Metro/York) during a twenty-year period that will not be generated because of waste reduction efforts; and*



GTA 3Rs ANALYSIS
MAP OF THE GREATER TORONTO AREA

FIGURE 1.1

b) *the amount of waste that will be generated in the primary service area during a twenty-year period that will not need to be disposed of in the site because of the reuse or recycling of materials that are or could become waste.*

These waste estimates were provided to the IWA by Minister's letter dated May 15, 1992. A copy of this letter may be found in Appendix A. The current study provides additional analysis of 3Rs activities, in support of the reasonableness of the waste diversion estimates previously provided.

The second requirement pertains to analysing the 3Rs as "alternatives to" landfill waste disposal sites. Section 15 of the *Waste Management Act* requires that the IWA environmental assessments contain a description of, and statement of rationale for the 3Rs, as well as evaluate matters relating to the 3Rs as an alternative to the landfill waste disposal sites. By administrative agreement, MOEE committed to provide such a rationale and evaluation to the IWA for use in its environmental assessments. The present report fulfils this requirement.

A number of parameters guided the GTA 3Rs Analysis. The study parameters are as follows:

- The study area for the GTA 3Rs Analysis is the area encompassing Metro Toronto and the Regional Municipalities of Durham, York, Peel and Halton. Metro Toronto/York Region, Durham Region and Peel Region are defined in the *Waste Management Act* as the "primary service areas" for the purposes of establishing landfill sites. The Region of Halton has been included as part of the 3Rs Analysis study area as it is part of the GTA. It is not, however, one of the "primary service areas". Thus, 3Rs systems have not been developed and evaluated for Halton Region.

- The MOEE is <u>not</u> the proponent or co-proponent of any 3Rs systems discussed in this study. The study provides additional analysis of 3Rs activities and supplemental data on waste diversion estimates for use by the IWA.

- As stated in Section 15(2) of the *Waste Management Act*,

  > *The environmental assessment is not required to contain any description of or statement of the rationale for, or any description or evaluation of any matter relating to,*
  >
  > *a)* *an alternative of waste reduction or reuse or recycling if that alternative would involve incineration of waste or the transportation of waste from the primary service area to any other area for disposal; or*
  >
  > *b)* *an alternative of some other single landfill waste disposal site if the capacity of the other site would appear to be inadequate in view of the estimate provided under Section 14.*

- The *Waste Management Act*, 1992 specifies that the IWA landfills are to operate for a minimum of 20 years.

1.3 Study Approach

The GTA 3Rs Analysis identifies and assesses alternative 3Rs systems, comprised of combinations of 3Rs programs, technologies and practices, that could reasonably be implemented in the GTA. In this report, this range of reasonable approaches to 3Rs are termed 3Rs system alternatives. It is also determines the potential for each 3Rs system to divert waste over the twenty-year minimum life expectancy of the GTA landfill sites, and identifies the advantages and disadvantages of each system.

For purposes of the present analysis, an array of conceptually different 3Rs systems have been identified for addressing residential wastes, as well as for institutional, commercial, and industrial (IC&I) wastes. For each system, estimates of the amount of waste the system could potentially divert from disposal have been determined. An assessment, done on a non-site-specific, generic level and documented in this report, identifies the advantages and disadvantages to the environment of each potential 3Rs system, in keeping with the *Environmental Assessment Act*.

In conducting the 3Rs work, and providing estimates of waste that will not require disposal in the IWA established sites, MOEE is acting as a reliable authority in accordance with its legislative mandate, and not as the proponent or co-proponent of any

of the 3Rs systems discussed. The alternatives presented in this report are not in any way structured as detailed implementation plans for the Province, the Regions or the private sector.

1.4 Related Studies and Reports

This EA Input Document is supported by five technical appendices:

- Cost Technical Appendix;
- Municipal Finance Technical Appendix;
- Natural Environment Technical Appendix;
- Service Technical Appendix; and
- Social Environment Technical Appendix.

The Technical Appendices document in detail, the input of each of the disciplines (criteria groups) in the systems evaluation.

1.5 Outline of Report

The following outlines the main chapters of the GTA 3Rs Analysis.

Chapter 2.0, entitled Study Approach, presents an overview of the study process and discusses the goals and objectives of the study.

Chapter 3.0 outlines the activities and results of the consultation program.

Chapter 4.0 describes each of the five regional municipalities in terms of socio-economic characteristics, natural environment, and municipal finance statistics. The existing waste management system is also described along with key diversion/waste management issues considered in the study.

Chapter 5.0 describes factors that must be considered in waste diversion.

Chapter 6.0 outlines how alternative 3Rs systems were developed and describes each alternative residential and IC&I 3Rs system.

Chapter 7.0 presents the approach followed to predict the net effects of the alternative 3Rs systems.

Chapters 8.0 to 11.0 present the net effects analysis undertaken for the residential 3Rs systems within each of the GTA regional municipalities.

Chapter 12.0 describes the net effects analysis for the IC&I 3Rs systems.

Chapter 13.0 presents the combined residential and IC&I regional diversion estimates.

Chapter 14.0 concludes the report by summarizing the results of the study.

A list of acronyms and a glossary are included at the end of the document.

2.0 STUDY APPROACH

The GTA 3Rs Analysis project was co-ordinated by the MOEE through the Fiscal Planning and Information Management Branch. Technical work was undertaken by four separate consulting firms who were contracted for the work. These contractors are referred to as the "study team" within this document.

The decision-making process for this study occurred systematically through a number of logical steps using an increasing level of detail.

Each key stage of this study led to a specific decision point or points. These stages, however, did not always progress in a simple sequential fashion. Rather, they were constantly reviewed, and in some cases, revised in light of new information as it became available. This iterative process ensured that the decisions which were made, were reviewed and their implications recognized.

The framework for decision making was based on a number of goals and objectives which are discussed below.

2.1 Definition of Goals

Goals represent the ends towards which an environmental assessment process (EA process) is directed serving as broad statements of what is to be accomplished.

This report identifies a range of reasonable 3Rs systems. To evaluate each system, and thereby evaluate 3Rs as an alternative to a landfill waste disposal site (Section 15(1), WMA), a set of goals were used. These are:

- **To minimize risk to human health and safety;**
- **To minimize negative environmental impacts and enhance natural and human communities;**
- **To maximize service and diversion rates; and**
- **To minimize cost.**

The rationales for these goals are as follows:

- Minimizing risk and negative environmental impacts, and enhancing natural and human communities reflect adherence to the requirements and spirit of the *EA Act* for the protection, conservation and wise management of the environment.

- The service and diversion goal relates to the ability of an alternative to meet waste diversion goals in an effective and socially acceptable manner.

- The goal of minimizing cost to the public and private sector relates to the provision of an alternative by one or both of the sectors in a cost effective manner.

The goals were used to group criteria and indicators throughout all steps of the evaluation. They also provided the framework for the definition of criteria for the evaluations. Criteria were selected to measure the achievement of goals and objectives. Data and results for each goal were considered separately and then trade-offs were considered among goals.

2.2 Study Process

The *Waste Management Act*, 1992, identifies the 3Rs as an alternative to the landfill waste disposal site in each primary service area (Section 15(1), WMA). It requires among other things, a description of and an evaluation of reduction in the amount of waste, and recycling or reuse of materials.

However, an evaluation of "3Rs" as a single waste management practice would not respond to the WMA requirement to examine alternatives. Therefore, this study examines a range of reasonable approaches to waste management which all fall under the general 3Rs label. In this report, this range of reasonable approaches to 3Rs are termed 3Rs system alternatives.

The study process selected was one modelled on the intent and requirements of the *EA Act*. Specifically, the study process:

- considered a reasonable range of alternatives;
- considered the full definition of the environment;

- systematically evaluated the net environmental effects of the options being considered; and
- considered public views on waste diversion.

Figure 2.1 presents the study process. This study process was applied to the regional municipalities within the "primary service area" (Metro Toronto and the Regions of Durham, York and Peel). For the Region of Halton, only the Existing and Existing/Committed 3Rs systems were described. Halton has already obtained approval for a landfill site and thus, is not part of the site search process. IC&I waste diversion analysis has included Halton as these activities transcend municipal boundaries. The following briefly discusses the main study activities and key decision points.

2.2.1 Study Process Overview

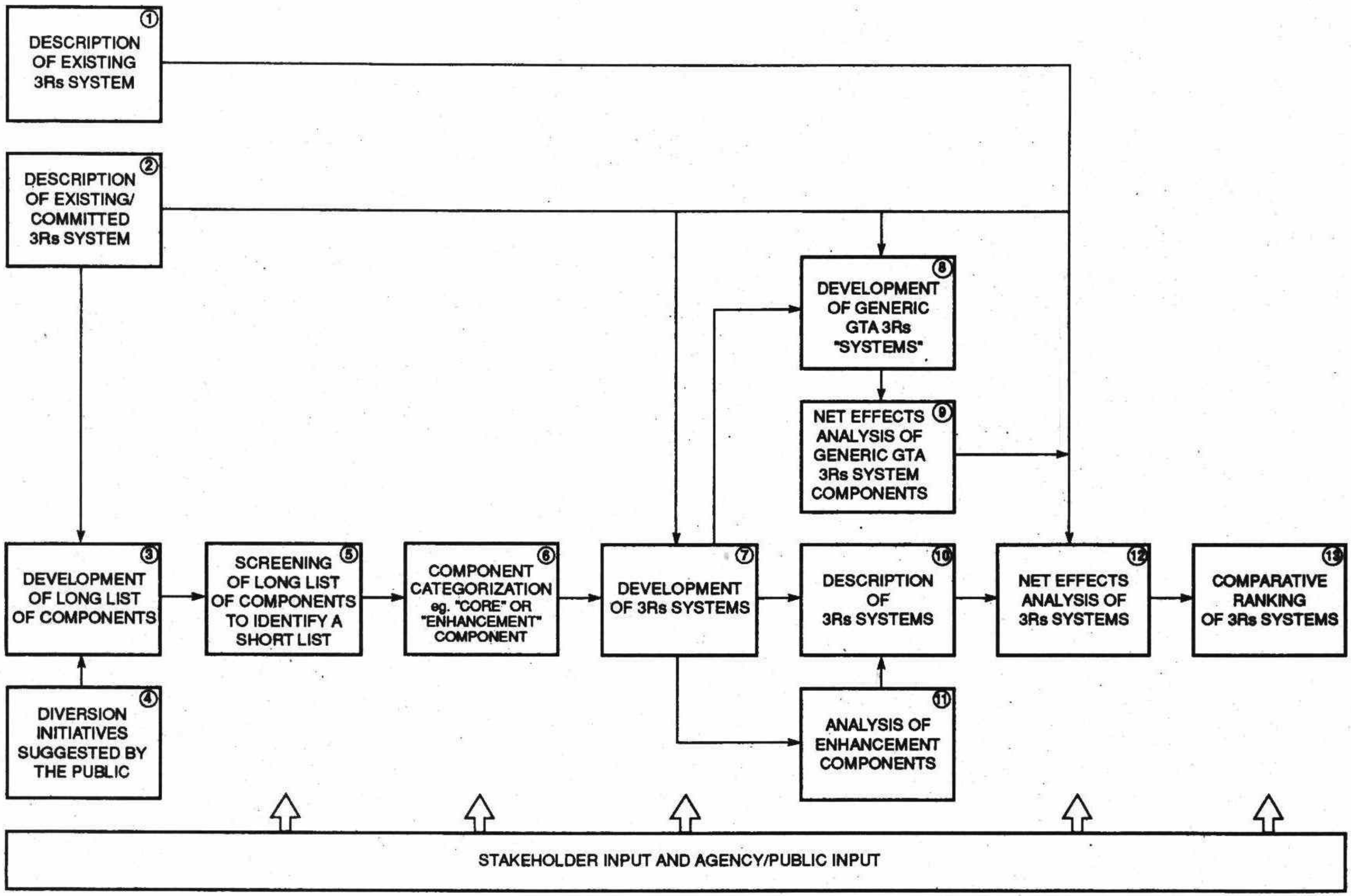
Key to the designing of alternative systems was the recognition of the Existing 3Rs system within each of the Regional Municipalities (Step 1). The Existing system was identified as the 3Rs system in place within each Regional Municipality as of December 31, 1992. The Existing system was described for both the residential/municipal sector for each Regional Municipality, and for the IC&I sector at the GTA level.

Using the Existing system as a base, the next step (Step 2) was to define the Existing/Committed system. Commitments made through five-year regional and municipal budgets and Federal and Provincial policies announced by December 31, 1992, which were considered likely to occur, formed the basis of this system. Once identified, these 3Rs commitments were then translated into components and added to the Existing system to form the Existing/Committed system.

A long list of components were then developed (Step 3). Included in this long list were components suggested by the public and identified by the study team from existing reports and past public consultations (Step 4). Chapter 3.0 discusses in greater detail how public suggestions and comments were identified and incorporated.

The long list of components were then screened (Step 5) using three criteria. To pass the screen and proceed to the next step in the evaluation, each component was judged to:

- represent a proven technology, technique or program;
- satisfy government standards and regulations; and
- divert a reasonable quantity of waste from disposal.



GTA 3Rs SYSTEM DEVELOPMENT AND EVALUATION APPROACH

FIGURE 2.1

Section 5.5 defines these screening criteria in more detail.

Step 5 screening identified a short list of alternative 3Rs system components.

The short listed components were then categorized as either core or enhancement components (Step 6) (Figure 2.1). Core components (e.g. Enhanced Blue Box) served as the focus for alternative system development. Enhancement components could be added to systems to enhance system performance and increase waste diversion. Enhancement components were further divided into primary and secondary enhancement component categories. Primary enhancement components (e.g. promotion and education) are proven to add an important element that would contribute to the function of a waste diversion system. Secondary enhancement components could be added to systems to increase waste diversion, but were not considered critical to their function. Only core and primary enhancement components were included in alternative waste diversion systems developed for analysis in the GTA.

Based on the categorized components, alternative systems were then developed (Step 7) and then described (Step 10).

The next step was to determine the net effects of each system on the basis of the Cost, Municipal Finance, Natural Environment, Service and Social Environment Criteria Groups. Recognizing the amount of overlap between the Regional systems, a net effects analysis at a GTA level was first done on all the components found within each of the systems developed for each of the Regional Municipalities (Steps 8 and 9). The components and their net effects were then recombined into the Regionally based 3Rs systems to create the Net Effects Analysis for each individual system for each Region (Step 12). Chapter 7.0 discusses, in greater detail, the approach taken to develop the net effects.

Based on the net effects, the final step of the study process was the ranking of each alternative system within each criterion group (Step 13).

2.2.2 Assumptions Overview

A number of key study assumptions were followed through the GTA 3Rs Analysis Study. Assumptions which were of relevance to the overall study are outlined below. Assumptions specific to the individual disciplines/criteria groups are discussed in the Technical Appendices.

- The study period extends from 1996 to 2015.

- Markets will be available for the recycled materials and compost from source separated compostables.

- Residential waste diversion systems are developed and analyzed separately for each GTA Region. However, because there is no effective waste management boundary for IC&I waste and recyclables (IC&I waste management is not confined by municipal boundaries), IC&I waste diversion systems are developed for the GTA as a whole.

- Regulations identified in the IC&I systems are assumed to be enforced equally throughout the Province and for all systems.

- 3Rs components would be developed in a manner that fulfils the necessary MOEE approvals (e.g. Certificate of Approval).

- The 3Rs systems developed are considered reasonable, represent a range of plausible diversion approaches and do not necessarily represent the highest possible diversion at all times.

- The mixing and matching of 3Rs components beyond what is done in this report is possible but not assessed due to the large number of possible permutations and combinations.

- The net effects analysis is based on the year 2000, the year in which all systems are assumed to be fully operational.

- The analysis is generic; specific sites/locations for new facilities for each of the systems were neither known nor considered.

- The potential effects of landfill were not considered in the systems net effects.

- The effects of a facility are attributed to the region which uses it.

- All systems were analyzed to the same level of detail.

- It is assumed that larger facilities will be sited to minimize effects (i.e. located in areas most compatible with the facility) through a systematic site selection process.

- Mitigation measures identified are readily available and would be implemented effectively.

- The diversion rate estimates were generated for the year 2000 (the year by which the systems were assumed to be fully operational) and for the 20 year cumulative study period. Increases in diversion rates after the year 2000 are attributed to source reduction.

- A combined diversion rate estimate was determined for Metro Toronto and the Region of York. Alternative systems, however, were evaluated separately for these two Regions.

- Only effects directly attributable to the 3Rs systems development and operation were considered.

- For all of the residential 3Rs systems, it is assumed that the system would be designed and managed such that there would not be any increase in the total number of collection vehicle trips in any residential area, or any increase in the net amount of time required to pick up materials.

- The export of waste, for the purposes of this study, was considered disposal.

3.0 CONSULTATION ON GTA 3RS ANALYSIS

The purpose of the consultation program for the GTA 3Rs Analysis was to identify and consider the views and suggestions of relevant stakeholders. Stakeholders include both members of the public and government agencies. Consultation has occurred over three stages. The first stage was conducted in 1992 in conjunction with the IWA. The second stage occurred from February 1993 to July 1993 while the main work on the GTA 3Rs Analysis was being conducted. The third stage occurred after the announcement of the preferred IWA landfill sites and focused on the Draft GTA 3Rs Analysis EA Input Document which was released for public review. This consultation provided stakeholders with the opportunity to comment on methods and assumptions used to estimate the amount of GTA waste likely to be diverted through 3Rs programs, that would otherwise have to be landfilled and the net environmental effects of these 3Rs systems.

3.1 Stage 1 Consultation Program

The consultation program conducted for the GTA 3Rs analysis project commenced on June 4, 1992, at the same time the IWA announced its Long List of Candidate Landfill Sites. At this time, the consultation focus was on the GTA waste diversion estimates provided by the Minister to the IWA on May 15, 1992. A summary report, "Public Consultation on Waste Diversion Estimates Provided to the Interim Waste Authority", prepared by the Waste Reduction Office, and documenting this 1992 program, appears in Appendix B.

The dates and locations of the eight IWA Information Centres (IC) in the three Primary Service Areas attended by Ministry staff/representatives to discuss waste diversion estimates were as follows:

Date (1992)	Location of IC
June 4, 5, 6 and 8	Pickering
June 4, 5 and 8	Bowmanville
June 4, 5, 8 and 9	Port Perry
June 4, 6, 8 and 11	Bolton
June 4, 6, 8, 13 and July 9	Snelgrove
June 4, 6, 8 and 11	King City
June 4, 6 and 8	Stouffville
June 4, 6 and 8	Sutton

At the above-noted ICs, information on MOEE's role in achieving the Province's waste diversion targets (at least 50% by 2000) was provided. Materials distributed are contained in Appendix B.

At four of the ICs (Sutton, Stouffville, King City, and Snelgrove), sessions were held by MOEE staff to discuss waste diversion. These sessions were attended by people expressing an interest on sign-up sheets posed at each of the eight ICs, and who were later telephoned and invited. Twenty-four people participated.

Overall, response at the open houses signalled that an aggressive diversion approach was desired by those who attended in order to make landfilling less necessary. In York Region, IC attendees strongly expressed their opposition to the size of the proposed site, not because of the calculations used, but because the facilities would also be used for Metro Toronto's garbage. Concerns were raised at each meeting about the financial commitment involved in siting landfills, the latter being perceived as much greater than the commitment to 3Rs.

Some individuals were uneasy that diversion initiatives put in place by the government would not be sustained over time. This could leave industries that had changed their operations to conform to diversion initiatives in a vulnerable position and communities hosting landfills would be forced to accept materials (and potentially greater volumes) for which the sites had not been designed. Some participants felt that the Provincial Government should require communities (and individuals) to recycle and reduce, through user pay systems, mandatory source separation and stiffer penalties for not meeting diversion targets.

As part of this consultation program, representatives of the Ministry also met with IWA Regional Consultation Networks (RCN) (multi-stakeholder committees representing various interests in each Primary Service Area).

Results of the Stage 1 consultation were used primarily to gain an appreciation as to general issues associated with 3Rs. These issues helped to focus the subsequent analysis in terms of what could be reasonable 3Rs systems for the GTA.

3.2 Stage 2 Consultation Program

The second stage occurred from February 1993 to July 1993 while the main work on the GTA 3Rs was being conducted. During this period, the GTA 3Rs Analysis study team examined past (GTA and Provincial) waste management initiatives and the results of consultation activities conducted for these. Materials from the following programs were reviewed:

- **Solid Waste Environmental Assessment Project** (SWEAP) Metro Toronto;
- **Solid Waste Interim Steering Committee** (SWISC) approach to landfill siting and waste management;
- **Waste Reduction Office** Waste Management Initiatives Papers; and
- **IWA Landfill Site Search** Public Consultation Documentation.

Full references of documents consulted appear in Appendix C. It is noted that a number of social surveys were also conducted as part of these studies. This information was considered by the Social Environment discipline in the GTA 3Rs system evaluation and is documented in the Social Environment Technical Appendix.

Public comments were primarily used in developing the long list of 3Rs components and subsequent system development. Appendix C contains a summary of key points raised during these programs.

The following is a summary of the key points discussed.

3.2.1 Suggested Waste Diversion Approaches

The following summarizes the diversion initiatives which were suggested by the public. Most of the initiatives which were suggested were either infrastructure related or forms of legislation/regulation.

Education

- education programs for school children;
- educate public on 3Rs.

Economic

- user pay system for garbage generated at residences;
- tax industries creating excess garbage and packaging;
- eliminate economic subsidies to industry;
- deposits on all beverage containers;
- reward developers and producers of biologically acceptable products;
- charge a tax on garbage generation; and
- tax individuals for not participating in 3Rs programs.

Infrastructure

- large central materials recovery facility (MRF);
- municipally based composting;
- borrow recycling technology from Japan;
- Eco Farms Waste Management System (a system which separates waste and reprocesses the separated materials for reuse);
- use sophisticated sorting facilities which feed gasification plants for energy production;
- anaerobic digesters;
- hand sort waste to make sure recyclables are removed;
- use ESDEX Recycling Corp;
- waste reproduction facilities specializing in individual waste streams;
- look at Wet/Dry sorts;
- composting programs for leaf and yard waste, and food waste;
- buy restaurant composters from ECO Corp;
- provide neighbourhood leaf shredders in Fall; and
- provide separate recycling bins outside shopping malls.

Legislation/Regulation

- pass legislation against over-packaging;
- allow scavenging at landfill sites;
- mandate source separation;
- product stewardship;
- reduction of packaging;
- laws that prevent consumers from waste generation;
- styrofoam and similar products should be banned;
- government should force manufacturers to produce recyclable/reusable products;

- companies should be taking their containers back;
- mandatory reuse standards for consumer goods;
- emulate "Green Dot Law" in Germany;
- advertising should be restricted to the air waves; and
- legislation to prevent sale of non-recyclable materials.

Other

- serious reduction and intensive recycling similar to North Hampstead, New York or Camden County, New Jersey;
- reuse and recycle items in old landfill sites;
- more recycling and reusing at manufacturer's level;
- have they ever considered putting leaf compost in farm fields; and
- more effort into building markets for recycled products and materials.

3.2.2 Public Comments on Waste Diversion

Comments regarding the advantages and disadvantages of diversion initiatives reflect concerns, problems and preferences raised by the public. A number of comments indicate a general concern as to how municipalities would fund diversion initiatives. The comments also indicate that the public may not be willing to pay more in taxes for these initiatives.

A number of comments were made with regard to the problems of home composting such as difficulties for the elderly/disabled, the possible attraction of vermin, and non-availability of composting to multi-unit buildings. Comments were also made indicating a preference for wet collection over home composting.

3.2.3 Stage 2 Conclusions

A general conclusion drawn from these consultation programs is that the public perceives that not enough is being done with respect to the 3Rs. Those who commented indicated that 3Rs programs should be mandatory, that present diversion targets are too conservative, and that the approval process should be reviewed so that it does not work against the development of recycling facilities. The comments also suggest that the public is supportive of initiatives that would encourage recycling including the development of markets for secondary materials.

Key waste diversion technologies/programs suggested included:

- user pay;
- economic/tax incentives;
- product stewardship;
- source separation;
- expansion of materials collected by Blue Box; and
- backyard composting.

The diversion programs suggested by the public were summarized and included in the long list of waste diversion components which were used to build the alternative systems as discussed in Chapter 6.0.

3.3 Stage 3 Consultation Program

3.3.1 Overview of Stage 3 Activities

The Stage 3 consultation program for the GTA 3Rs Analysis began on November 12, 1993 with the IWA announcement of the preferred sites and release of *EA Document IV*. At that time the Draft GTA 3Rs Analysis EA Input Document was also released. The following briefly describes the key activities that were undertaken as part of the consultation program in this stage.

Documentation Release

In addition to the GTA 3Rs documents, an article on 3Rs was published in the IWA's *Landfill News* and a summary report (by study area) and fact sheet were prepared for the general public. The summary and fact sheet were provided in English and French.

The Draft GTA 3Rs Analysis EA Input Document, and the summary and fact sheet were sent to RCNs, site groups, municipalities, libraries and the IWA Reading Room. In addition, copies of the 3Rs summary report and fact sheet were also distributed to residents at the preferred landfill site in each study area. Government review agencies also received the GTA 3Rs documentation.

In early December 1993, letters were sent out to non-government organizations and IC&I organizations. Eight NGOs and 34 IC&I organizations received copies of the EA Input Document draft. As well, letter contact was made with 62 NGOs in December. Later in February 1994, after further review and consideration of potential stakeholders, a letter

was sent to 68 additional IC&I groups, to inform them of the study and the availability of draft documentation.

Copies of all GTA 3Rs documentation were available on request at the IWA Information Centres, through the IWA Public Consultation Offices and from MOEE. In total, approximately 170 requests for GTA 3Rs documentation were received and filled.

IWA Information Centres

For a three-week period (November 12, 1994 to December 3, 1994) representatives of the GTA 3Rs study team attended the IWA Information Centres (ICs) in each of the study areas approximately three times per week. At each IC, displays focusing on the GTA 3Rs study were set up. Discussions on waste diversion occurred with Information Centre visitors. After the three-week period, Draft GTA 3Rs documentation remained at the IC's and staff discussed 3Rs issues as required.

A sign-up sheet for public seminars on 3Rs was also available at the information centres. There were no requests for a public seminar in any of the three study areas.

Meetings with Municipal Representatives

To verify data collected in the preparation of the draft reports, a number of contacts and meetings were held with staff of local municipalities and Regions. Presentations were also made to Metro Toronto Works Committee, City of Scarborough Works Committee and the Township of Uxbridge. These were the only municipalities who requested presentations.

IWA Information Line

As part of the IWA public consultation program, a toll-free information line was established for each study area. This information line also responded to questions and documentation requests in regards to the GTA 3Rs analysis.

RCN Presentations

MOEE offered to present the GTA 3Rs Analysis to the IWA RCNs in the three study areas. A presentation to the Peel RCN was made on Tuesday, April 26, 1994. The Metro/York and Durham RCNs declined the offer of a presentation.

Review of Participants' Reports

In response to the IWA site selection process, a Citizens Coalition group was established. Several reports dealing with waste diversion were received from this group. These reports were reviewed by the GTA 3Rs study team and responses to these issues developed. Responses to these reports by the GTA 3Rs study team are contained within the IWA *EA Document V*, Volume 2.

Government Review Agency - Briefing Session

In January 1994, the IWA held a briefing session for government review agencies. Representatives of MOEE attended this session and made a presentation on the GTA 3Rs analysis.

Telephone Contacts

In March 1994, telephone contacts were made with government review agencies, NGO agencies and IC&I representatives. The purpose of these contacts was to enquire whether further 3Rs documentation was required, whether the agencies planned to submit comments, to remind agencies of the due date for submitting comments and to collect recent municipal data. In total, attempts were made to contact approximately 300 individuals/organizations.

IC&I Focus Groups

Additional information on the IC&I sectors attitudes and perceptions related to the array of generic diversion systems considered in the GTA 3Rs analysis was obtained through focus group research.

The specific objective of the research was to assess the impact of IC&I 3Rs systems on a range of IC&I organizations based on the following questions:

- What effect could each system have on their particular organization?
- Are the individual systems viable? What barriers are envisaged?
- What are the perceived benefits and problems in implementing the systems?
- What are the potential economic impacts of the system?
- Would the systems favour the competition? Are they fair and equitable?

Two focus groups were conducted February 22 and 25, 1994, in Toronto. The participants were 13 recycling co-ordinators/environmental managers, representing the following organizational sectors:

- Education: two public school boards, one university and one community college;
- Healthcare: institutional association;
- Industry environmental association;
- Manufacturer;
- Grocery retail chain;
- Food service association; and
- Waste handling/diversion industry associations (two).

3.3.2 Stage 3 Conclusions

General Public

As previously discussed, a variety of initiatives were undertaken to gain input from the public into the GTA 3Rs analysis work. These included preparation of review materials, information centres, toll free telephone lines and opportunity for public seminars. For the most part, very few comments were received on 3Rs issues from individual members of the public and none directly related to the GTA 3Rs report despite numerous requests for documentation. Issues raised by the public tended to be generalized comments, e.g. "why is not more waste diverted?"

Government Agency Review Comments

As part of the public consultation program, documentation was distributed to both provincial and municipal governments. Comments were received from Durham Region, Metro Toronto, City of Toronto, City of Scarborough and City of Mississauga. 3Rs staff at York and Peel Regions were apparently directed not to participate in the program.

Comments received from the municipalities tended to focus on providing data updates on costing/budgets and municipal 3Rs commitments. The Regions were also consulted to confirm population and employment projections. Other comments related to the individual components contained within the alternative systems and the estimated diversion rates of these systems. The full list of government agency comments received and responses to the comments are contained within Appendix C.

Other Written Submissions

Only three other written submissions of the 3Rs draft documentation were received. They included two IC&I organizations and one consultant. Again the comments tended to be criticisms of the alternative 3Rs systems which were developed. Comments and responses are contained in Appendix C.

Comments received from the IC&I organizations focused on the increased costs associated with increased diversion requirements and that a system based on centralized composting be added.

Other comments received were largely criticisms of the alternative 3Rs systems considered and the assumptions used in the analysis.

Telephone Contacts

IC&I, NGO and provincial agencies were contacted to request comments. Through the telephone contacts, only a few comments were received on the documentation. For the most part, although interested in the work, organizations indicated they were not planning to submit written comments.

Municipal and RCN Presentations

The following key issues were raised at each of the presentations.

- Uxbridge Town Council (January 26, 1994)
    - concern about costs of 3Rs activities required by 3Rs Regulations;
    - suggested that there be deposits on soft drink containers and beverages be sold in refillable containers;
    - questioning that costs did not increase for higher diversion systems;

- Metro Toronto Works Committee (February 3, 1994)
    - key issue discussed was why Metro per household cost for diversion is higher than Durham Region's;
    - asked for confirmation that 50% diversion will not be achieved by Existing/Committed systems;

- Scarborough-Traffic and Works Committee (February 23, 1994)

    - concerns with nuisance effects associated with backyard composters;
    - requested clarification on MOEE's position in not being a proponent or co-proponent;
    - questioned whether 50% diversion objective is applicable to lower-tier municipalities;
    - questioned what provincial funding would be available in the future;

- Mississauga (March 7, 1994)

    - concerned with backyard composter diversion rate assumed;
    - concerned with applying Quinte data to the GTA;
    - Mississauga is currently considering an expanded leaf and yard waste collection program and noted that they collect through their Blue Box program, many more materials than required by the provincial 3Rs regulations;

- City of York (March 10, 1994)

    - no specific concerns were raised with the discussion focusing on the purposes of the study and programs underway in City of York.

- Peel RCN (April 26, 1994)

    - concern was raised about costs of the 3Rs systems;
    - considered the analysis incomplete without the consideration of incineration and energy recovery and that export should be considered in the analysis;
    - concerned about the availability of markets for recovered material;
    - concern about additional 3Rs regulations increasing the costs of doing business in Ontario;
    - asked if no unprocessed waste to landfill could be accomplished through landfill bans, and whether flow control would be required to achieve the diversion estimated for this system.

Comments made at the meetings were considered by the study team. A key change resulting from the meeting was revision to the assumed diversion rates from backyard composters based on pilot programs in Mississauga, and a change in three stream collection costs as a result of information provided by City of Mississauga.

IC&I Focus Groups

The following themes were evident in both sessions:

- Economic imperatives drive the private sector. Recycling can only be an effective form of waste reduction when markets have been put in place. Currently, there are limited rewards/incentives in place to expand 3Rs programs.

- Funding and training are needed to create effective 3Rs programs management support.

- Education and training are essential because the 3Rs programs in some organizations are being designed and operated by people with incomplete knowledge.

- Organizations cannot operate 3Rs programs in isolation from their suppliers and consumers, e.g. the greater the cost of the 3Rs program, the greater the product of service.

- Public attitudes are impeding the expansion of 3Rs programs, i.e. are so preoccupied with the Blue Box that other, possibly more effective solutions, are not getting the attention they deserve.

- The prospect of increased illegal dumping of materials is a concern related to expanded 3Rs programs. Many businesses find that others are dumping in their recycling bins, increasing costs and contaminating the recyclable streams.

As well, the IC&I Focus Groups identified the following concerns with respect to the six different IC&I 3Rs systems:

System 1- Existing IC&I System

Some waste management co-ordinators are questioning the benefits of recycling. Recyclables represent a low proportion of the waste stream and the market infrastructure is undeveloped. However, some programs are diverting as much as 50% of the waste stream.

System 2 - Existing/Committed

This system was criticized for being too heavily weighted to recycling and not enough to reduction and reuse. There was general agreement that System 2 was workable. There was less support for mandatory source separation.

System 3 - Extended 3Rs Regulations

There were some strong opinions expressed on the escalating importance of recycling as a means of minimizing waste. It only makes sense, it was argued, if there are ready markets for the materials. Extra training and inducements might be required to get staff to comply.

System 4 - Expanded 3Rs Regulations

The focus on recycling in this scenario also evoked criticism. Because it was believed to cover 90% of the IC&I sector, it was seen as a bigger problem. It was felt that this system would require expanded enforcement because organizations would be compelled to comply.

System 5 - Expanded 3Rs Regulations with Organics

Large generators of organic wastes were enthusiastic about this system. However, they felt the definition needed broadening to include dry compostables. As well, the feasibility of the program was questioned, given current public opposition to large composting facilities. Others seriously questioned the composting emphasis, arguing that there would be no markets for this material and that it might cause greater environmental damage.

System 6 - No Unprocessed Waste to Landfill

A costly double sorting system was envisaged - source separation plus sorting by haulers. It was felt that the costs of this system might drive businesses out of the Province. A zero garbage option was seen as totally unworkable and possibly even unnecessary.

The results of the IC&I focus groups confirmed original hypotheses used in the Social Environment assessment in regards to effects predicted on the IC&I sector and mitigation which was considered to be appropriate.

In conclusion, comments received through the consultation program were reviewed and addressed by the appropriate study team member and considered in the preparation of documentation.

4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

This chapter describes the existing environment for the regional municipalities of Durham, York and Peel and Metro Toronto from the perspective of:

- municipal finance;
- social environment;
- natural environment; and
- the existing waste management system.

These descriptions provide the context for the study. This chapter also describes several issues that were taken into account when considering waste generation and diversion. It therefore lays the foundation for developing alternative potential waste diversion systems in later sections of this report.

4.1 Municipal Finance

This section summarizes the financial profile for each of the GTA Regions and their constituent area municipalities. A complete financial profile is presented in the Municipal Finance Technical Appendix. The cost of 3Rs activity in the GTA is also reviewed.

4.1.1 Durham Region

4.1.1.1 Property Assessment, Tax and Other Revenue

On average, residential assessment in Durham Region in 1992 approached 85% of the total tax base, with the commercial/industrial sector representing the remaining 15%. However, the residential/commercial split ranged quite considerably. The Cities of Oshawa and Whitby maintained a commercial/industrial sector that ranged between 21 and 24% of the tax base. In the smaller municipalities, however, the commercial/industrial sectors ranged between 6 and 12% of the tax base.

On average, residential property taxes in Durham Region approached $3,115 per household in 1992. This consisted of $676.00 for local purposes; $548.00 per household for the regional levy; $328.00 in direct charges and, $1,562.00 for school purposes. In 1992, the school portion of property taxes approached 50%, with the regional levy approaching 18% and the local levy being 22%. While property taxes for regional and

local purposes totalled $220 million in 1992, 68% ($150 million) was derived from the residential sector with 32% ($69 million) paid by the commercial/industrial sector.

In total in 1992, property taxes represented 38% of all of the municipalities' revenue sources. Provincial and Federal grants totalled $170 million in 1992 and this represented 30.0% of total revenue. Similarly, program revenue totalled $111 million in 1992 representing 19%.

4.1.1.2 Operating Expenditures

In total, operating expenditures in the Durham area approached $571 million in 1992. The Region itself accounted for $355 million, or 62% of total. Expenditures related primarily to Social Services - 166.8 million; Waterworks and Sanitary Sewage - $91.7 million; and, Police - $94.0 million. Local expenditures, on the other hand, related primarily to Road Maintenance and Repair - $86.7 million; Recreation - $53.2 million; and, Fire Protection - $38.8 million and Planning- $13.2 million.

Waste management costs in Durham Region (Region and area municipalities) totalled $21.3 million in 1992. This includes approximately $5.7 million for 3Rs programs which represented 1.0% of the total Region's 1992 operating expenditures of $571.3 million.

When expressed on a per household basis total regional expenditures approached $4,057.00 per household with regional expenditures representing approximately 62% of the total and local expenditures representing the remaining 38%.

4.1.1.3 Capital Expenditures and Reserves

In 1992, capital expenditures for the Durham area (Region and area municipalities) approached $106 million and this consisted mainly of Road Maintenance and Repair - $47.3 million; Water and sewer - $62.2 million; Recreation - $11.0 million; General Government - $2.6 million, Police and Fire Protection - $5.5 million and other capital costs - $20.0 million. These capital expenditures were funded from: reserves and reserve funds - 20%; general tax revenue 32%; Provincial Grants - 15%; debenture borrowing 30% and other revenue 3%.

Total outstanding debt in Durham in 1992 approached $71.9 million, of which $11.8 was held by the Region itself. This represented an average of $511.00 per household when both the Region and area municipalities are combined. To finance this debt, debt charges in Durham totalled $13.2 million and this represented about $94.00 per household. When

expressed as a percentage of expenditures, which is the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire regional area in 1992 represented 2.3%.

In 1992, reserve funds totalled $222 million for both the Region and the area municipalities. The Region itself maintained $113.5 million in reserves and reserve funds while the area municipalities maintained $108.5 million. When combined, these funds represented a 39% coverage of annual operating expenditures and, in total, these funds approach $1,576.00 per household.

4.1.2 Metropolitan Toronto

4.1.2.1 Property Assessment, Tax and Other Revenue

On average, residential assessment in Metropolitan Toronto in 1992 approached 55% of the total tax base, with the commercial/industrial sector representing the remaining 45%. This residential/commercial split is relatively consistent throughout Metro except for the smaller municipalities. The City of Toronto maintained the highest commercial ratio in 1992 at 56.0%, while Etobicoke, Scarborough, and North York ranged between commercial ratios of 36 to 44%. At the same time, York and East York, however, maintained a commercial/industrial sector that represented between 24 and 26% of the tax base.

On average, residential property taxes in Metropolitan Toronto Region approached $2,771 per household in 1992. This consisted of $479.00 for local purposes; $677.00 per household for the regional levy; $199.00 for direct charges, and, $1,416 for school purposes. In 1992, the school portion of property taxes approached 51%, with the regional levy approaching 24% with the local levy being 17%. While property taxes for regional and local purposes totalled $2.1 billion in 1992, 51% ($1.086 billion) was derived from the residential sector with 49% ($1.062 billion) paid by the commercial/industrial sector.

In total in 1992, property taxes represented 41% of all of the municipalities' revenue sources. Provincial and Federal grants totalled $1.6 billion in 1992 and this represented approximately 30% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $896.6 million in 1992 and this represented 17% of total revenues.

4.1.2.2 Operating Expenditures

Operating expenditures in Metropolitan Toronto Region approached $5.3 billion in 1992. Metro itself accounted for $3.7 billion, with the area municipalities totalling $1.6 billion. Metro expenditures related primarily to: Social Services - $1.5 billion; Transportation - $853.3 million; Police - $586.6 million; and, Waterworks and Sanitary Sewage - $236.5 million. Local expenditures, related primarily to: Recreation - $361.1 million; General Government - $333.9 million; Fire Protection - $289.9 million; Road Maintenance and Repair -$51.6 million; and Planning - $61.1 million. When expressed on a per household basis Metro's expenditures approach $6,038 per household.

Total Waste Management costs in the Metropolitan Toronto Region (Region and area municipalities) totalled $187.8 million in 1992. When the 1992 costs of $47.0 million for 3Rs are compared, it can be shown that waste diversion represented 0.9% of the total area's 1992 operating expenditures of $5.3 billion.

4.1.2.3 Capital Expenditures and Reserves

In 1992, capital expenditures for the Metro Region approached $753 million and this consisted mainly of Transportation and Road Maintenance - $306.4 million; Water and sewer - $130.4 million; General Government - $86.6 million; Recreation - $95.9 million; Solid Waste Management - $17.4 million and, other capital spending - $116.3 million. These capital expenditures were funded from: general tax revenue 20%; reserves and reserve funds - 18%; Provincial Grants - 26%; debenture borrowing - 22% and other capital financing - 14%.

Total outstanding debt in the Metro area in 1992 exceeded $1.0 billion, of which $512.6 was held by Metro itself. This represented an average of $1,200.00 per household when both the Metro and area municipalities are combined. To finance this debt, debt charges in the Metropolitan Toronto area total $230.0 million which represents about $263.00 per household. When expressed as a percentage of expenditures, which is the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire regional area in 1992 represented 4.4%.

In 1992, reserve funds totalled 968.4 million for Metro. Metro itself maintained $332.0 million in reserves and reserve funds while the area municipalities maintained $636.4 million. Combined, these funds represent an 18% coverage of annual operating expenditures and, in total, these funds approach $1,107.00 per household.

4.1.3 York Region

4.1.3.1 Property Assessment, Tax and Other Revenue

On average, residential assessment in York Region in 1992 approached 73% of the total tax base, with the commercial/industrial sector representing the remaining 27%. This residential/commercial split, however, ranged considerably. On the one hand, the City of Vaughan maintained a commercial/industrial sector that represented 38% of the tax base. Newmarket and Richmond Hill maintained commercial/industrial ratios between 22 and 24%. In the smaller municipalities, however, the commercial/industrial sectors ranged between 8 and 17% of the tax base.

On average, residential property taxes in York Region approached $3,295 per household in 1992. This consisted of $582.00 for local purposes; $368.00 for the regional levy; $273.00 in direct charges and, $2,072 for school purposes. In 1992, the school portion of property taxes approached 63%, with the regional levy approaching 11% with the local levy being 18%. While property taxes for regional and local purposes totalled $253 million in 1992, 69% ($174.6 million) was derived from the residential sector with 31% ($77.9 million) paid by the commercial/industrial sector.

In total in 1992, property taxes represented 46% of all of the municipalities revenue sources. Provincial and Federal grants totalled $143.2 million in 1992 and this represented 26% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $87.3 million in 1992 and this represented 16% of total revenues.

4.1.3.2 Operating Expenditures

Operating expenditures in York Region approached $593 million in 1992. The Region itself accounted for $285 million, with the area municipalities totalling $308 million. regional expenditures related primarily to Social Services - $118.7 million; Police - $59.3 million; and, Waterworks and Sanitary Sewage - $74.6 million. Local expenditures, on the other hand, related primarily to Recreation - $71.3 million; Road Maintenance and Repair -$60.3 million; Fire Protection - $44.2 million and Planning -$12.5 million (Schedule A, York). When expressed on a per household basis regional expenditures approach $3,667.00.

Total Waste Management costs in York Region (Region and area municipalities) totalled $41.6 million in 1992. When the 1992 costs of $4.9 million for 3Rs are compared, it can

be shown that 3Rs programs represented less than 1% of the total Region's 1992 total operating expenditures of $592.8 million.

4.1.3.3 Capital Expenditures and Reserves

In 1992, capital expenditures for York Region approached $139.4 million and this consisted mainly of Road Maintenance and Repair - $53.3 million; Recreation - $32.0 million; General Government - $29.9 million; Water and Sewer - $17.0 million and capital costs for other purposes - $7.2 million (Schedule A, York). These capital expenditures were funded from: reserves and reserve funds - 40%; debenture borrowing - 30%; Provincial Grants - 14%; general tax revenue 10% and other capital financing - 6%.

Total outstanding debt in the York area in 1992 approached $13.4 million, of which $39.9 was held by the Region. This represented an average of $826.00 per household when both the Region and area municipalities are combined. To finance this debt, debt charges in York totalled $15.2 million per year which represented about $94.00 per household. When expressed as a percentage of expenditures, which is the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Region area in 1992 represented 2.6%.

In 1992, reserve funds totalled 290.2 million for the Region and the area municipalities. The Region itself maintained $107.4 million in reserves and reserve funds while the area municipalities maintained $182.8 million. When combined, these funds represented a 50% coverage of annual operating expenditures and, in total, these funds approach $1,796.00 per household.

4.1.4 <u>Peel Region</u>

4.1.4.1 Property Assessment, Tax and Other Revenue

On average, residential assessment in Peel Region in 1992 approached 82% of the total tax base, with the commercial/industrial sector representing the remaining 18%. This residential/commercial split was relatively similar throughout Peel Region. The City of Mississauga maintained a commercial/industrial sector that represented 18% of the tax base, while Brampton's ratio approached 17%. Caledon's ratio approached 14%.

On average, residential property taxes in Peel Region approached $3,077 per household in 1992. This consisted of $546.00 for local purposes; $478.00 per household for the

regional levy; $314.00 for direct charges and, $1,740 for school purposes. In 1992, the school portion of property taxes approached 57%, with the regional levy approaching 16% and the local levy being 18%. While property taxes for regional and local purposes totalled $393 million in 1992, 62% ($243.2 million) was derived from the residential sector with 38% ($149.4 million) paid by the commercial/industrial sector.

In total in 1992, property taxes represented 45% of all of the municipalities revenue sources. Provincial and Federal grants totalled $222.5 million in 1992 and this represented 25% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $181.4 million in 1992 and this represented 21%.

4.1.4.2 Operating Expenditures

Operating expenditures in Peel Region approached $883 million in 1992. The Region itself accounted for $476 million, with Mississauga totalling $269 million, Brampton $120 million and Caledon $17 million. Regional expenditures related primarily to: Social Services - $193 million; Waterworks and Sanitary Sewage - $117 million; and, Police - $114 million. Local expenditures related primarily related to: Road Maintenance and Repair - $128 million; Recreation - $82.3 million; Fire Protection -$68.0 million and Planning - $13.3 million. When expressed on a per household basis total regional expenditures approach $3,730.00.

Waste Management costs in Peel Region (Region and area municipalities) totalled $32.4 million in 1992. When the 1992 costs of $7.5 million for 3Rs are compared, it can be shown that they represent less than 1.0% of the Regions 1992 total operating expenditures of $883 million.

4.1.4.3 Capital Expenditures and Reserves

In 1992, capital expenditures for Peel Region approached $189.4 million and this consisted mainly of Road Maintenance and Repair - $66.7 million; Recreation - $36.7 million; Water and sewer - $47.1 million; General Government - $14.9 million, Solid Waste - $6.0 million and other capital costs - $18.0 million. These capital expenditures were funded from: reserves and reserve funds - 50%; Debentures - 26.0%; Provincial Grants - 10%; general tax revenue 11% and other financing 3%.

Total outstanding debt in the Peel in 1992 approached $146.4 million, of which $52.5 was held by the Region. This represented an average of $618.00 per household. To finance this debt, debt charges in Peel area totalled $37.9 million and this represented about $160.00 per household. When expressed as a percentage of expenditures, which is the

Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Region in 1992 represented 4.3%.

In 1992, reserve funds totalled 811.7 million for the total Region. The Region itself maintained $376.1 million in reserves and reserve funds while the area municipalities maintained $435.6 million. When combined, these funds represented a 92% coverage of annual operating expenditures and, in total, these funds approach $3,428.00 per household.

4.1.5 Halton Region

4.1.5.1 Property Assessment, Tax and Other Revenue

On average, residential assessment in Halton Region in 1992 approached 74% of the total tax base, with the commercial/industrial sector representing the remaining 26%. This residential/commercial split was relatively similar throughout Halton Region. The Town of Milton maintained the largest commercial/industrial sector, at approximately 31%, followed closely by Burlington and Oakville at 26% of the tax base.

On average, residential property taxes in Halton Region approached $2,863 per household in 1992. This consisted of $604.00 for local purposes; $408.00 per household for the regional levy; $278.00 in direct charges and, $1,573 for school purposes. In 1992, the school portion of property taxes approached 55%, with the regional levy approaching 14%, the local levy being 21% and direct charges approached 10%. While property taxes for regional and local purposes totalled $170.7 million in 1992, 69% ($117.2 million) was derived from the residential sector with 31% ($53.5 million) paid by the commercial/industrial sector.

In total in 1992, property taxes represented 47% of all of the municipalities revenue sources. Provincial and Federal grants totalled $87.3 million in 1992 which represented 24% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $76.0 million in 1992 which represented 21%. On average, non-tax revenues approached $29.7 million or 8.2% of total revenue in 1992.

4.1.5.2 Operating Expenditures

Operating expenditures in Halton Region approached $364.8 million in 1992. The Region itself accounted for $200 million, with Burlington and Oakville exceeding $165 million. regional expenditures related primarily to: Waterworks and Sanitary Sewage - $47.1 million; Social Services - $65.4 million; and, Police - $35.7 million (Schedule A,

Halton). Local expenditures related primarily to: Road Maintenance and Repair - $51.0 million; Recreation - $44.4 million; Fire Protection - $27.4 million and Planning - $6.6 million.

Total Waste Management costs in Halton Region (Region and area municipalities) totalled $26.9 million in 1992. When the 1992 costs of $5.4 million for 3Rs are compared, it can be shown that they represented 1.5% of the total Region's 1992 operating expenditures.

Regional expenditures expressed on a per household basis approach $3,269.00 with local expenditures representing 45% and regional expenditures representing 55%.

4.1.5.3 Capital Expenditures and Reserves

In 1992, capital expenditures for Halton Region approached $115.7 million and this consisted primarily of Road Maintenance and Repair - $48.3 million; Water and sewer - $15.8 million; Recreation - $7.8 million; General Government - $3.1 million, Solid Waste - $14.2 million and other capital costs - $26.5 million. Capital expenditures were funded from: reserves and reserve funds - 31%; Provincial Grants - 22%; general tax revenue 13%; debenture borrowing - 32% and other revenue 2%.

Total outstanding debt in Halton in 1992 approached $150 million, of which $100 million was held by the Region. This represented an average of $1,346.00 per household when both the Region and area municipalities were combined. To pay this debt, debt charges in Halton totalled $26.4 million per year and this represented about $237.00 per household. When expressed as a percentage of expenditures, which is the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire regional area in 1992 represented 7.3%. (A ratio approaching 20% is considered high.)

In 1992, reserve funds totalled $177.3 million for the Region. The Region itself maintained $89.2 million in reserves and reserve funds while the area municipalities maintained $88.1 million. When combined, these funds represented a 49% coverage of annual operating expenditures and, in total, these funds approach $1,589.00 per household.

4.1.6 Municipal Finance Review

Each of the GTA Regions has very different financial characteristics which are impacted by the following economic indicators:

- the size of the commercial and industrial sector within the Region's tax base;
- the sources of revenue available to finance expenditures;
- the actual level of service expenditures;
- the amount of debt carried by the tax payers;
- the amount of reserves available to fund expenditures; and
- the actual (or average) level of property taxes.

It can be seen that each Region has a different mix and blend of financial characteristics. Specifically, after reviewing the financial base information the following pattern can be discerned:

- Metropolitan Toronto is able to undertake much more costly service expenditures while maintaining similar tax levels as other Regions due to its large diversified commercial and industrial tax base (at 45% of total property assessment - Table 4.1) to draw on;

- The Region of Durham and Metropolitan Toronto rely more on Provincial Grants (at 30% of total revenue - Table 4.1) than the other GTA Regions. This may be partly a result of the Province's funding formulae for general welfare assistance.

- The Region of Halton has the lowest level of operating expenditures per household (at $3,269 per household - Table 4.1) for combined regional and local service operations than the remainder of the GTA Regions. Metro has the highest level of operating expenditures at $6,038 per household partly due to some of its services such as the TTC that are not provided in other GTA Regions.

- The Region of Halton maintains the lowest level of per household expenditures for local service operations ($1,430 - Table 4.1) and the second lowest for regional operations ($1,572).

TABLE 4.1

GTA EXISTING FINANCIAL CONDITIONS (1992)

	DURHAM		METRO		YORK		PEEL		HALTON	
	($)	(%)	($)	(%)	($)	(%)	($)	(%)	($)	(%)
HOUSEHOLDS	140,831		875,021		161,654		236,775		111,586	
ASSESSMENT										
Residential %		85		55		73		82		74
Commercial %		15		45		27		18		26
AVERAGE TAX (/ Hsld)										
Local	676	22	479	17	582	18	546	18	604	21
Regional	548	18	677	24	368	11	478	16	408	14
Schools	1,562	50	1,416	51	2,072	63	1,740	57	1,573	55
Other Direct Charges	328	11	199	7	273	8	314	10	278	10
Total	3,114	100	2,771	100	3,295	100	3,078	100	2,863	100
REVENUE ($000's)										
Municipal Property Taxation										
Residential & Farm	150,275	31	981,779	21	166,331	22	243,261	23	117,242	28
Comm/Ind./Bus.	69,236	14	1,061,613	23	77,948	10	149,449	14	53,504	13
Other Special Charges	0	0	105,028	2	8,312	1	0	0	0	0
School Taxes	259,601	54	2,505,252	54	496,925	66	653,867	62	242,412	59
Total	479,112	100	4,653,672	100	749,516	100	1,046,577	100	413,158	100
REVENUE DISTRIBUTION ($000's)										
Property Taxation (Local)*	219,512	38	2,148,420	41	252,590	46	392,711	45	170,746	47
Con/Unconditional Grants	170,573	30	1,578,194	30	143,211	26	223,525	25	87,360	24
Payments in Lieu of Taxes	11,852	2	152,131	3	3,078	1	20,999	2	6,016	2
Fees & Service Charges	59,025	10	421,228	8	60,533	11	62,038	7	23,683	7
Program Revenues	111,548	19	896,564	17	87,315	16	181,478	21	76,098	21
Total	572,510	100	5,196,537	100	546,727	100	880,751	100	363,903	100
OPERATING EXPENDITURES (/hsld)	4,057		6,038		3,667		3,730		3,269	
CAPITAL FUND REVENUES (/hsld)	1,155		807		998		1,061		1,272	
CAPITAL FUND EXPENDITURES (/hsld)	753		860		862		800		1,037	
LONG TERM DEBT (/hsld)	511		1,200		826		618		1,346	
DEBT CHARGES (/hsld)	94		263		94		160		237	
RESERVES (/hsld)	1,576		1,107		1,796		3,428		1,589	

***Differences in over/under levies have been added to Regional levy.**

SOURCE: MARS 1992, Ministry of Municipal Affairs

- The Regions of Durham and Peel have the lowest levels of debt (at $511 and $618 per household, respectively) of all the GTA Regions. This results in a low debt capacity guideline, as provided by the Ministry of Municipal Affairs. (This excludes debt related to the York-Durham Sewage System which is Provincially operated.)

  The debt capacity guideline was previously administered by the Ontario Municipal Board and is now within the auspices of the Ministry of Municipal Affairs (MMA). (See Bill 165 An Act to Amend Certain Acts Related to Municipalities - Royal Assent June 25, 1992 and Ontario Regulations 710/92 made under the Municipal Act.) It is defined as debt charges (principal and interest) taken as a percentage of total operating expenditures. For the Regions of Durham and York these ratios have been calculated at 2.3% in Durham and 2.6% in York.

  (Peel Region does not use this guideline for internal purposes since it ignores uncontrollable Provincial program expenses administered at the municipal level. Notwithstanding this, and despite disentanglement efforts, the guideline is still official MMA policy.)

- The Region of Peel has the largest level of reserve funds at $3,428 per household (Table 4.1) as compared to the other GTA Regions. Among other things these funds are used to finance 3Rs programs.

- All Regions rely heavily (38 to 47%) on local property taxation as a source of revenue.

4.1.7 The Cost of 3Rs Activities in the GTA

Table 4.2 summarizes 3Rs costs in the GTA. It is compiled from 1992 operating financial statements and excerpts from waste management reports. The detailed municipal breakdown of 3Rs program costs is presented in the Municipal Finance Technical Appendix.

This table demonstrates the gross and net costs of 3Rs activities on the individual households within the Regions. The table excludes the various internal financing sources that may be used to offset costs, such as, tipping fees or reserve fund financing. This is presented in this manner because regardless of internal (local) financing and after outside funding sources are taken into account, all charges ultimately are borne by the local

taxpayer. This table takes into account: material sales and Provincial funding sources, and therefore excludes: internal financing, diversion credits, etc.

Table 4.2 also reflects the amount of commercial, industrial and business taxes paid at the local level so that a clear determination could be made of the remaining net household costs. Also, inter-municipal payments, mostly all from the Regions to the lower tier, to offset diversion costs are accounted for in the analysis, so that proper consolidations can be made.

The figures do not include the cost of disposing diversion material. Most Regions do not charge for this because it effectively represents an internal transfer from the diversion program to the disposal program. Our discussions with waste managers, however, suggest that this aspect is not material, ranging around 1% of total diversion volume.

For the entire GTA residential 3Rs efforts in 1992 approached $89.6 million. While costs in Metro approached $54.2 million, 3Rs costs approached $35.4 million in the rest of the GTA Regions. This included: Peel Region - $11.6 million, York Region - $9.2 million, Durham Region - $6.9 million and Halton Region - $7.5 million.

After material sales and MOEE funding of $18.9 million are considered, net operating costs approached $70.6 million. While net costs in Metro totalled $47.0 million net costs for the rest of the GTA Regions total $23.6 million. This is comprised of: Peel Region - $7.4 million, York Region - $4.9 million, Durham Region - $5.7 million and Halton Region $5.4 million.

According to Resource Integration Systems figures, total residential tonnage generated in 1992 in the GTA approached 1,901,001 tonnes, with approximately 398,625 tonnes diverted from landfill and the remaining 1,502,376 tonnes going to landfill. This equates to an overall residential diversion of approximately 21% for the entire GTA.

TABLE 4.2
TOTAL GTA 3Rs COSTS
1992

Region	Net Cost	Residential Share of Taxes	Residential Costs	Residential Cost Per Household
Durham Region	$ 5,758,350	69%	$ 3,944,470	$28
Metro Toronto	47,046,995	45%	22,582,558	26
York Region	4,988,208	68%	3,391,981	21
Peel Region	7,460,817	62%	4,618,246	20
Halton Region	5,401,033	69%	3,710,510	33

Source: Municipal Budgets
Ministry of Municipal Affairs
MARS (Municipal Archive Retrieval System)

Table 4.2 also presents 3Rs costs on a household basis. To determine the household cost of 3Rs programs, a non-residential share of net costs was excluded from the calculations. This was done to reflect the fact that a portion of local taxes is paid by the commercial/industrial sector. Throughout the GTA, net costs in 1992 for 3Rs programs averaged $25.00 per household. This amount ranged from $26.00 per household in Metro to $25.00 per household in the rest of the GTA. Regionally, household costs were: Peel - $20.00 per household, York - $21.00 per household, Durham - $28.00 per household and Halton $33.00 per household.

Table 4.3 shows the individual per household costs for 3Rs as compared to the household municipal tax levels (excluding schools). It is pointed out that not all of these costs are directly funded by the individual tax levies. In some Regions these costs are either funded by tipping fees and/or reserve fund contributions. This table demonstrates, however, the relative magnitudes of net 3Rs costs as compared to municipal taxation.

TABLE 4.3
PER HOUSEHOLD 3Rs COSTS
COMPARED TO MUNICIPAL TAXATION
(Excluding School Levies)
1992

Region	Taxation	Cost of 3Rs	Percent
Durham Region	$1,553	$28	1.8
Metro Toronto	1,355	26	1.5
York Region	1,223	21	1.7
Peel Region	1,337	20	1.5
Halton Region	1,290	33	2.6

Source: Future Urban Research
Ministry of Municipal Affairs
MARS (Municipal Archive Retrieval System)

4.2 Natural Environment

The following presents a discussion of the existing natural environment conditions in the Regions of Durham, Metro Toronto, York and Peel. The descriptions are a general overview of the conditions in each Region for geology/ground water, surface water and biological aspects of the natural environment. These are natural environment features which would be affected by the 3Rs systems. Although the potential for effects to the atmospheric environment are examined in the 3Rs systems net effects analysis, the atmospheric environment is not described here. The information provided identifies existing natural environment conditions in the Regions to provide a basis for assessing the alternative 3Rs systems. These descriptions are used to facilitate the prediction of potential effects to the natural environment, when comparing and evaluating the alternative 3Rs systems. Much of the information presented in the descriptions is based on Chapman and Putnam (1984), Dillon and Gartner Lee (1987) and MacLaren (1990).

The Natural Environment Technical Appendix provides a more detailed description of the existing natural environment conditions for each of the Regions.

4.2.1 Durham Region (Natural Environment)

4.2.1.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Durham Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area. Municipal and domestic water supplies are provided from overburden aquifers.

Much of the southern portion of Durham Region, south of the Oak Ridges Moraine, is urban land which is serviced by water from Lake Ontario. Urban growth is expanding northward from the built-up area along the Lake Ontario shoreline. As this occurs, more communities are switching from traditional ground water supplies to Lake Ontario water. Major overburden aquifers in the South Slope aquifer complex are therefore gradually being replaced as a source of domestic water supply. However, the demand for municipal ground water supplies from the Oak Ridges Moraine are presently increasing for communities to the north as residential development continues to increase the demand for water.

Bedrock aquifers are not heavily utilized as a source of municipal or domestic water in Durham Region due to the abundance of overburden aquifers and the relatively poor aquifer characteristics of the bedrock. Exceptions to this occur where there is a shallow depth to bedrock and no alternative water supplies are available.

4.2.1.2 Surface Water and Surface Water Use

Durham Region is situated in three major watersheds, namely:

- Lake Simcoe/Georgian Bay;
- Lake Ontario; and
- Trent River System.

The major surface water body in the area is Lake Ontario. Durham Region borders on Lake Ontario. Two other major lakes in the Region include Lake Simcoe and Lake Scugog.

A number of active water quality stations are located on rivers and streams in the Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, special studies have been undertaken on some watercourses, including Wilmot Creek.

Water quality in streams in the area is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout Durham Region. Better water quality is likely to be found in the head water areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low. Important fisheries occur in several streams throughout the area.

Surface water in Durham Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation.

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.1.3 Biological Characterization

The portion of the study area which drains to Lake Ontario is heavily urbanized. This has resulted in negative impacts on stream flow and water quality, which in turn have affected the structure of fish communities. Natural vegetation consists of remnant woodlots and treed river valley and ravine areas. These areas provide habitat for plant and animal species.

Major rivers in or near Durham Region within the Lake Ontario drainage basin include the Rouge and Ganaraska. Considerable effort has been expended in developing an anadromous salmonid fishery in this area. Major watercourses in the Region within the Lake Simcoe drainage basin include Pefferlaw Brook and Beaverton River. These watercourses generally support warm-water fish populations. Agricultural land uses are prominent in the basins of the watercourses draining to Lake Simcoe.

The Oak Ridges Moraine is a prominent topographic feature in Durham Region which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. It lies in an east-west direction in the middle of the area. The Moraine is of biological significance because it contains large tracts of forest and it contributes baseflow to headwater areas of cold and cool-water streams.

The southern part of the study area is within the Deciduous Forest Region. Plant communities having southern affinities are well represented, for example, in the valley of the Rouge River. The northern part of the study area is situated within the Great Lakes - St. Lawrence Forest Region.

The biology of most of Durham Region has been relatively well studied. Basin and regional surveys have established the status of bird and plant species, in particular.

4.2.2 Metro Toronto (Natural Environment)

4.2.2.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Metro Toronto Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area.

Metro Toronto is generally urban land which is serviced by water from Lake Ontario. Urban growth has expanded northward from the Lake Ontario shoreline. Communities in the Region have switched from traditional ground water supplies to Lake Ontario water.

4.2.2.2 Surface Water and Surface Water Use

Metro Toronto is situated in the Lake Ontario watershed. Surface water in the Region drains southwards to Lake Ontario.

Water quality stations are located on rivers and streams in the Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, many special studies have been undertaken throughout the area including Mimico Creek, Humber River and the Don River.

Water quality in streams in the Region is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use; and
- transportation corridors.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout the Region.

Lake Ontario has received much study by Provincial and Federal agencies due to its important role as a source of drinking water to communities along its shore, and its high recreational value.

Persistent toxic substances and eutrophication have been identified as problems in Lake Ontario by the International Joint Commission and its member agencies.

Areas of concern have been identified in the Great Lakes including one in Metro Toronto, namely Toronto Harbour. Provincial Water Quality Objectives are exceeded at this location. As a result, intensive studies have been initiated to develop remedial action plans; including the clean-up of beaches.

Surface water is used for a wide variety of purposes in Metro Toronto including:

- aquatic life;
- recreation;
- drinking water supply (Lake Ontario);
- industrial water; and
- waste assimilation.

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.2.3 Biological Characterization

Most of the Metro Toronto is heavily urbanized. This has resulted in negative impacts on stream flow and water quality, which in turn have affected the structure of fish communities. Natural vegetation consists of remnant woodlots and treed river valley and ravine areas. These areas provide habitat for plant and animal species.

Major rivers in Metro Toronto and within the Lake Ontario drainage basins include: the Humber, Don, Highland Creek and Rouge. Considerable effort has been expended in

developing an anadromous salmonid fishery in these areas. The Oak Ridges Moraine is a prominent topographic feature north of Metro Toronto which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. The moraine is of biological significance because it contains large tracts of forest and it contributes baseflow to headwater areas of the cold and cool-water streams.

Metro Toronto is within the Deciduous Forest Region. Plant communities having southern affinities (e.g. Carolinian) are well represented, for example, in the valley of the Rouge River.

The biology of the Region has been relatively well studied. Basin and regional surveys have established the status of bird and plant species.

4.2.3 York Region (Natural Environment)

4.2.3.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout the York Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area. Municipal and domestic water supplies are provided from overburden aquifers.

Much of York Region, south of the Oak Ridges Moraine, is urban land which is serviced by water from Lake Ontario. Urban growth is expanding northward from the Metro Toronto area. As this occurs, more communities are switching from traditional ground water supplies to Lake Ontario water. Major overburden aquifers in the South Slope aquifer complex are therefore gradually being replaced as a source of domestic water supply. However, the demand for municipal ground water supplies from the Oak Ridges Moraine and deep overburden aquifers within bedrock valleys is presently increasing for communities in the northern part of the Region (Aurora, Newmarket) as residential development continues to increase the demand for water.

Bedrock aquifers are not heavily utilized as a source of municipal or domestic water in the Region due to the abundance of overburden aquifers and the relatively poor aquifer characteristics of the bedrock. Exceptions to this occur where there is a shallow depth to bedrock and no alternative water supplies are available.

4.2.3.2 Surface Water and Surface Water Use

York Region is situated in two major watersheds, namely:

- Lake Simcoe/Georgian Bay; and
- Lake Ontario.

The drainage divide between these two major watersheds runs from east to west through the middle of the Region. The drainage divide parallels the Oak Ridges Moraine.

Active water quality stations are located on rivers and streams in York Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, many special studies have been undertaken on some watercourses including: the Humber River, Don River, Holland River and Black River.

Water quality in streams in the area is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout the Region. Better water quality is likely to be found in the headwater areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low. Important fisheries occur in several streams throughout the area.

Surface water in York Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation.

4.2.3.3 Biological Characterization

Major rivers in the Region within the Lake Ontario drainage basin include: the Humber, Don and Rouge. Considerable effort has been expended in developing an anadromous salmonid fishery in these areas. Major watercourses in the Region within the Lake Simcoe drainage basin include: the Holland River, Black River and Pefferlaw Brook. These watercourses generally support warm-water fish populations. Agricultural land uses are prominent in the basins of the watercourses draining to Lake Simcoe.

Marshes at the mouths of certain of these watercourses are of biological significance. Nearshore areas of Lake Simcoe may also be of biological importance.

The Oak Ridges Moraine is a prominent topographic feature in York Region which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. The Moraine is of biological significance because it contains large tracts of forest and it contributes baseflow to headwater areas of the cold and cool-water streams.

The southern part of the Region is within the Deciduous Forest Region. Plant communities having southern affinities are well represented, for example, in the valley of the Rouge River. The northern part of the study area is situated within the Great Lakes-St. Lawrence Forest Region.

The biology of most of the Region has been relatively well studied. Basin and regional surveys have established the status of bird and plant species, in particular.

4.2.4 Peel Region (Natural Environment)

4.2.4.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Peel Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major bedrock and overburden aquifers in the area. Some municipal and domestic water supplies are provided from bedrock and overburden aquifers.

Peel Region has a complex hydrogeologic setting as a result of its diverse geological history. In general, relatively permeable glacial deposits (ice contact stratified drift) in the northern portion act as ground water recharge areas to overburden aquifers and the bedrock.

Much of the southern portion of Peel Region is urban land which is serviced by water from Lake Ontario. Urban growth continues to expand northward from the built-up area (Mississauga) on Lake Ontario. As this growth occurs, communities will continue to switch from traditional ground water supplies to Lake Ontario water. Generally, the municipalities in Peel Region located north of Brampton rely on ground water as the source of their domestic water supply.

4.2.4.2 Surface Water and Surface Water Use

Peel Region is situated in two major watersheds, namely:

- Lake Simcoe/Georgian Bay; and
- Lake Ontario.

The majority of Peel Region drains southeast to Lake Ontario. This represents the area south of the Oak Ridges Moraine (approximately).

The major streams in this area are:

- Humber River;
- Credit River;
- Etobicoke Creek; and
- Mimico Creek.

A very small area in the northern part of Peel Region (north of the Oak Ridges Moraine) drains to Georgian Bay and Lake Simcoe. There are no major streams for this drainage system in Peel Region. Surface water drains to the Nottawasaga River, Bailey Creek and Holland River, which are situated outside of the Region.

The major surface water body in the area is Lake Ontario.

Water quality in streams in the Region is generally impacted by point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at monitoring stations in the Region. Improved water quality is likely to be found in the head water areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low.

Lake Ontario is the only major lake in the area. A great deal of study has been conducted on Lake Ontario due to its important role as a source of drinking water to communities along its shore and its high recreational value.

Surface water in Peel Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.4.3 Biological Characterization

Significant natural environment features exist in the Region of Peel. These natural environment features include:

- provincial parks and Conservation Authority lands;
- hazard lands (as identified in official plans);
- environmentally significant areas;
- areas of natural and scientific interest (ANSI's-life and earth sciences);
- provincially and regionally significant wetlands (Class 1-7);
- OMNR Agreement and Woodlot Improvement Act (WIA) forests;
- licensed pits and quarries;
- significant warm water and cold water watercourses.

The Region of Peel is located in the Great Lakes St. Lawrence Forest Region. Natural woody vegetation in this regime is characterized by eastern white and red pines, eastern hemlock and yellowbirch. The majority of the forested areas of the Region lie within Caledon reflecting the rural character of the Town. Extensive urban development has removed much of the large wooded areas in the City of Mississauga and to a lesser degree

in the City of Brampton. In these areas, forest resources are generally restricted to scattered woodlots, ravines and environmentally protected areas. The forest management potential generally is low in Mississauga, low to moderate in the City of Brampton and moderate to high in the Town of Caledon. Similarly, important wildlife resource areas associated with valleylands, upland habitat (e.g. Niagara Escarpment) and ravines are more concentrated in the Town of Caledon. Important ravines are also associated with the Lake Ontario shoreline.

The cold-water headwaters of the Credit and Humber Rivers lie within the northern half of Caledon which has been identified by MNR as a cold-water stream zone.

4.3 Social Environment

The existing Social Environment of the GTA is described through the analysis of demographic, housing and employment characteristics and trends. This information was used in the GTA 3Rs analysis for three purposes: to forecast future waste generation; to assess whether future social characteristics will influence the achievement of waste diversion efforts; and to provide a basis for the assessment of potential social effects in each Region and the GTA. The method of analysis used is described in the Social Environment Technical Appendix.

4.3.1 GTA (Social Environment)

Demographic Characteristics

Demographic information was used in the GTA 3Rs analysis to determine the current population characteristics of each Region, how the population is changing and to calculate future waste projections.

The GTA is the most populous urban Region in Canada and comprises 41% of Ontario's population and 14.7% of Canada's population (Canadian Urban Institute, 1991a). The GTA has experienced considerable growth since the early 1980s and will continue to be the major growth centre of the Province of Ontario over the planning period.

The GTA has registered a 1991 population of 4,235,756 representing growth of 10.2% from 1986. Within the GTA, Metro Toronto has over half of the population at 2,275,771, representing 53.7% of the total population. The next largest population concentration occurs in Peel Region with 732,798 residents and 17.3% of the GTA population.

York Region and Durham Region have similar population levels. Halton has the smallest population of the GTA. York, Durham and Halton Regions respectively have 11.9, 9.6 and 7.3% of the population of the GTA.

Population growth in the Toronto Census Metropolitan Area (CMA) is being driven primarily by immigration, although it is currently at 60% of the late 1980s levels (CMHC, 1993a). Peel and York Regions grew fastest over the last decade and they will continue to do so. Metro saw a loss of population growth. Over the later phases of the GTA 3Rs planning period, Durham Region is also expected to experience greater population growth. While Metro is targeted to grow due to intensification efforts, the regional municipalities are expected to absorb significantly greater growth to the year 2015 and beyond.

The population projections selected for the GTA 3Rs Analysis are presented in the Social Environment Technical Appendix.

Lifestyle and Culture

The lifestyle and cultural context affect how 3Rs programs are accepted and the factors contributing to their implementation. The current language diversity within the GTA varies considerably. The diversity of cultural groups will continue to grow over the planning period.

The nature and extent of cultural change over the planning period is strongly influenced by Federal immigration policy. Since 1986, 75% of the 154,000 immigrants to the Metro Toronto area were from Asia, the Caribbean, Latin America and Africa. Significant numbers have also immigrated from Poland and Portugal (Canadian Urban Institute, 1991b). At least 40% of the immigrants do not have a functional command of English and the rate is high among people whose mother tongue is Chinese, Vietnamese, Punjabi, Spanish and Portuguese.

There was an increase in language diversity from 1981 to 1991 within the GTA. Overall, as the third largest language group, the Chinese population appears to be the fastest growing of the language groups in the GTA. Polish speaking people also increased as a proportion of GTA population. After English, Italian, Chinese and Portuguese speaking cultural groups are the next largest. GTA 3Rs educational and communications material should be oriented to these and other divergent language groups. Waste diversion programs must be cognizant of diverse neighbourhoods and the need to tailor programs to meet local language and cultural conditions.

Shift in Age Profile

Overall, the GTA is experiencing a proportional decline in the numbers of younger people as the baby-boom generation is no longer having children. There is also an increasing number of people over the age of 65.

Toward the year 2015, the number of people in the GTA younger than 19 is expected to continue to decline in proportion to other age groups. The median age of the population will be increasing (IBI, 1990c) with a steady increase in the number of elderly. Today, the elderly (over 65 years) constitute over 10% of the population. Over the next decade the proportion of elderly is expected to increase to 14% (Canadian Urban Institute, 1991b). As the population ages, more homes will be composed of "empty-nester" parents whose children live on their own, or single elderly individuals. This may influence the extent of adoption of GTA 3Rs components that require strenuous activities.

It is predicted that municipal service provision will reflect an aging population and will be targeted to: community health, culture and leisure, recreation involving less demanding sport, and senior citizen support services designed to allow them to remain in their homes (IBI, 1990c, p. 12). As the trend will be toward the integration of services, the integration of waste diversion programs may be influenced similarly.

Shift in Family Profile

Across the GTA, children and teenagers are expected to be raised increasingly in single-parent family households and family households containing children of different parents (blended families) (Canadian Urban Institute, 1991b).

To adjust to these changes, service providers in the GTA have moved toward rationalizing and integrating community-based services and facilities through future community hub-centres (e.g. based in school buildings). Any financial and time requirements that might be associated with waste diversion activities must be assessed in light of the time involved per family and other household costs. A shift toward convenience of the waste diversion activities and adaptability to demographic and neighbourhood conditions would likely assist diversion.

Shift in Income Profile

York Region continues to have the highest income while Durham Region has the lowest income of all Regions in the GTA. Understanding the differences in household income on

a regional basis is useful as an indicator of willingness to pay for composters and sensitivity to tax increases or user fees.

The Canadian Urban Institute further predicts the feminization of poverty, particularly among single parent households. Poverty will be further intertwined with race and ethnicity. Social services in the GTA are moving in the direction of being cost efficient (IBI, 1990c) to address this trend. To be effective, waste diversion activities must also ensure that efficiencies are achieved and programs are sensitive to the needs of the changing income strata in Metro Toronto and the GTA.

Housing

Information about housing supports the GTA 3Rs Analysis by considering whether waste diversion opportunities should focus on 3Rs components appropriate to each type of housing. In addition, information about households helped to determine whether people were owners or tenants, as a factor in the direct or indirect levy of collection fees. Across the GTA, several housing characteristics and trends have implications for the GTA 3Rs Analysis.

Current Household Characteristics

The GTA had a total of 1.487 million households in 1991. Household size across the GTA varied from 3.5 persons per household in Markham to a low of 2.3 persons per household in East York and Toronto. Most of the housing within the GTA is owned by the occupants. However, rates of home ownership vary considerably from a high of 82% in York Region to a low of 48% in Metro Toronto. The variation in rental and ownership rates has implications to the GTA 3Rs Analysis in terms of assumptions about the extent to which waste diversion activities depend on curbside pick-up or the efficiency of components that rely on Direct Cost diversion efforts.

The type of households also varies across the GTA and within each Region. For example, Metro Toronto is dominated by high-rise apartments closely followed by single family homes. Metro Toronto also has the highest percent of low-rise apartment housing stock in the GTA. In contrast, Durham Region has the most single family housing and the least amount of high-rise. Household types will influence the extent to which people can engage in recycling activities that require backyards.

GTA Housing Projections

Over the planning period for the GTA 3Rs Analysis, there is expected to be considerable variation in the rate and type of new housing constructed in the GTA. For example, the rate of growth of new housing in Metro Toronto is expected to increase but at a slower rate than in the past with much of the newer housing being multiple family, infill development. This type of housing construction is due primarily to the low amount of "green field" development land in Metro Toronto and Provincial housing initiatives. The regional municipalities are expected to experience growth of all housing types. By 2015, the GTA is predicted to have 2,402,552 units, representing a 66% increase over the current housing stock.

Several additional current and future trends include:

- Toronto Census Metropolitan Area is no longer the tightest rental housing market in Canada;
- there is very little ongoing private rental construction but the assisted rental construction component of the market has increased;
- singles, semi's and freehold townhouses dominate housing starts in the Toronto CMA;
- housing demand in the Toronto area is expected to be weak over the next few years due to lower household formation rates. In the late 1990s home ownership is expected to increase (CMHC);
- over the longer term, the rate of household growth in the GTA is expected to decline due to lower levels of net migration and the aging of the population out of the prime household formation stage;
- due to preferences of an aging population for high-rise and multiple family dwellings these housing forms are expected to increase in the 1990s; and
- shortages of developable land is expected to result in net zero growth of single-detached dwellings in Metro Toronto by the year 2000. Over the long-term, non-Metro Toronto regions are also expected to experience a decline in household growth.

Employment

In 1991, the GTA provided approximately 2,300,000 employment opportunities. About 60% of the jobs in the GTA were located in Metro Toronto. Peel Region provided the next largest number of jobs at 16.5%. Halton Region provided the fewest employment opportunities, at 6.2%. Based on Hemson projections, Peel and York Regions are anticipated to experience major gains in employment with Peel and York Regions accommodating the largest employment increases in the GTA to 2011. Durham and Halton will each experience about half of this employment growth.

The overall trends in the GTA are for increases in finance, insurance and real estate (FIRE) and service type employment. Since 1981, manufacturing has experienced the most significant decreases in employment opportunities. Similarly, labour force declines across the GTA have been greatest in the manufacturing sector and increases greatest in the service sector.

Employment in the GTA has shifted to the service sector, providing 21% of employment opportunities in 1991 from 25% employment in manufacturing in 1981. However, both the manufacturing and retail sector continue to provide considerable employment opportunities in the GTA. Within these sectors, Peel Region has the highest dependence on manufacturing; Metro Toronto has the highest percentage dependence on finance, insurance and real estate.

There are number of trends apparent with respect to future employment growth[1]:

- increasing female workforce participation rates will occur in the 35 - 65 age groups and will play a major role in the future growth of employment, although at reduced rates relative to the last two decades;

- while there has been a trend to low and decreasing employment in Metro, OGTA Scenario 1 presents a departure from this trend. Particularly, it suggests that Metro will be able to successfully stop the employment decline on employment lands and attract an additional 200,000 jobs;

1 Hemson Consulting Ltd., Employment Forecasts for the Greater Toronto Area to 2031. October, 1989; IBI Group, GTA Urban Structure Concepts Study, 1990a; AIMI, City of Toronto Official Plan Review, 1990; CMHC, 1993a; Hemson Consulting Limited/Coopers and Lybrand Consultants Limited, 1993.

- the Regions (vs. Metro Toronto) will continue to attract a growing share of future GTA employment and Peel and York will accommodate half of the future growth;

- Halton and Durham will gradually increase employment levels with more growth occurring over the longer term. A small proporfion of the growth is expected from office employment;

- household formation rates will continue until the turn of the century as the remainder of the baby boom generation enters the real estate market;

- continued rapid entry of women into the out-of-home labour force but at reduced rates relative to the last two decades.

- an aging workforce will increase the demand for consumer services (especially in the leisure market area) relative to spending on housing and "necessary" consumer durables;

- the distribution of jobs by activity has shifted such that goods producing activities have experienced a decline while service activities have increased;

- it is assumed that Metro Toronto's long-term employment will shift from industrial (manufacturing and wholesale) activities to offices while shares of employment in other sectors are expected to remain relatively stable; and,

- many of the new jobs to be created will either be higher income, high skilled service sector jobs or low-paying part-time employment. The GTA will also be influenced by the further automation of jobs and loss of traditional manufacturing jobs. A significant trend will be the continued emergenee of a bi-polar service sector of:

  1) highly rewarded educated management and professional service sector;
  2) disproportionate number of workers in lower paying jobs, poor backgrounds and under-educated workforce.

4.3.2 Durham Region (Social Environment)

Demographic Characteristics

In 1991, Durham had about 10% of the population in the GTA with 409,070 residents. The most populated centre in Durham Region is Oshawa followed by Pickering and Whitby.

Due to most of the land in Metro Toronto being developed, Durham Region is expected to experience higher growth rates than Metro Toronto, but less than York and Peel Regions. Durham is expected to receive 21% of the growth of the GTA between 1991 and 2015 York and Peel will continue to be the fastest growing municipalities over that period.

By 2015, Durham Region is expected to have 816,000 residents, representing a doubling of its current population. The population projections selected for Durham Region and other Regions within the GTA are presented in the Social Environment Technical Appendix.

Durham Region is linguistically the most homogenous region in the GTA with almost 90% of the population indicating English as their mother tongue.

Durham Region has a younger population and consequently, higher fertility rate. The remainder of the age groups in the Region are about average for the GTA. Over the planning period, most of the growth in Durham Region will be driven by immigration (as opposed to birth rate, rate of family formations etc). The median age for Durham residents will continue to be lower than for the Province of Ontario.

Durham Region had the lowest average household income of all Regions in the GTA. Given this, residential waste diversion scenarios involving additional household costs may have to consider Durham Region resident's ability to pay.

Housing

In 1991, Durham had 136,140 households. Consistent with population data, the majority of households are located in Oshawa followed by Pickering, Whitby and Ajax. About 25% of the housing units in Durham are rental units. This number of rental units is significantly less than Metro Toronto but more than York Region (17 %), the regional Municipality with the least housing units. CMHC reports that Durham municipalities are currently experiencing the highest rental vacancy rates in the GTA and the highest vacancies since they began surveying.

By 2015, Durham is expected to have approximately 306,675 households, more than a doubling from 1991. Average household sizes are expected to decline to 2.66 persons per household in 2015.

Single family housing dominates Durham Region's housing mix at 69% of the housing in the Region. Due to preferences of an aging population for high-rise and multiple family dwellings, these housing forms are expected to increase in the 1990s. Based on Clayton household projections, Durham Region is expected to have a considerable increase in single family housing units over the planning period. Most of the multiple family units in Durham are semi-detached, rows and townhouses (52.5%), 21.9% are high-rises; 25.5% are low-rises. A proportion of all housing units, 7.9% are high-rises and 6.8% low-rises.

Employment

On a percentage basis, Durham has had considerably greater employment growth than Metro Toronto, although jobs have not been created at the same rate as in York and Peel Regions. In 1991, Durham Region had a labour force of approximately 160,000 people. As with the other Regions, Durham is expected to experience increasing participation of females in the 35 to 65 age bracket.

Durham is expected to have 388,523 jobs by 2015. And overall, Durham will continue to attract employment growth in GTA but not as rapidly as Peel and York Regions. The majority of Durham's employment is in manufacturing and the service sectors. In contrast, Metro Toronto employs fewer people in manufacturing and more people in the service sector and finance, insurance and real estate.

Since 1981, Durham's employment base has shifted with a dominant change being a decline in the Primary and Manufacturing IC&I sectors and an increase in the Transportation, Communications, Utilities, Commercial Services and Public Administration Sector. These trends are expected to continue, reflecting broad employment shifts across the GTA.

Compared to local employment characteristics, the Durham labour force is much larger. It is characterized by a higher percentage of people in finance, insurance, real estate and public administration.

4.3.3 Metro Toronto (Social Environment)

Demographic Characteristics

With a 1992 population of 2.29 million people, Metro Toronto is the largest jurisdiction within the GTA. Population levels represent 53.1% of the population of the GTA. In terms of growth trends, there has been slower growth in Metro Toronto compared to the GTA Regions. However, OGTA Scenario 1 calls for policies that will make more effective use of the existing infrastructure in Metro Toronto by accommodating a larger portion of future growth. The scenario would create a more dense developed Metro Toronto with reduced requirements for development lands in each of the four Regions (Hemson/Coopers, 1993).

Metro Toronto is targeted for a long-term growth target of 2.6 million people with most of the growth driven by immigration. The dominant language in Metro Toronto is English at 64.2% of the population. With 17.1% of the residents speaking other languages, Metro Toronto has the most diverse language make-up of all Regions in the GTA, higher than the GTA average of 13.5%. The fastest growing Metro Toronto language groups are Chinese with both English and Italian experiencing declines.

Other language and cultural trends in Metro Toronto include: immigration characterized by people who may not have a functional command of English and people from Asia, the Caribbean, Latin America, Poland and Portugal.

Metro Toronto's population is aging, reflecting a general aging trend across the GTA. Metro Toronto had a median age of 31.5 for males (1986 Ontario average was 31.4) and 33.9 for females (1986 Ontario average was 33.1). Thus, Metro Toronto reflected the median age for Ontario. The median age of Metro Toronto, however, is expected to rise to 41.9 for males (2011 Ontario average will be 39.7) and 45.6 females (2011 Ontario average will be 42.7) to the year 2011. Thus, Metro Toronto is expected to have an increasingly older population than the Ontario average.

Within the GTA, Metro Toronto has the fewest people under the age of 19 (22.4%) and the highest number of people over 65 years of age at 12.8% Overall, there will be a rise in the percentage of retired persons as baby boomers retire over the planning period. Family characteristics in Metro Toronto are similar to those of the GTA and include a reduction in the number of children per family; increased divorce rate; and people marrying at a later age.

From 1981 to 1986, Metro Toronto continued to be the second lowest income Region with an average household income of $40,493. Residents of Halton, Peel and York Regions all have higher (average) incomes than Metro Toronto residents. Other income trends include:

- continued slide of disposable income;
- double income families as norm; and
- continued income stress.

To address changing demographic characteristics in Metro Toronto, local municipalities have begun to shift municipal service provision to community health, leisure, recreation, senior support services. Trends toward integration of municipal services may also be effective in the implementation of GTA 3Rs waste diversion activities.

Housing

In 1992 Metro Toronto had 875,021 households representing 57% of the GTA households. It is expected that there will be continuing rates of household formation due to children of baby boomers entering the housing market. By 2015, Metro Toronto is expected to reach 1,131,665 housing units. Many housing units will be over 60 years old and will be undergoing renovation. Other units will be higher density units resulting from infill development.

In 1991, Metro Toronto had 449,105 rental housing units, representing 74% of all of the rental housing units in the Greater Toronto Area. Metro Toronto also had more rental housing units (52%) than freehold units, representing the highest percent of rental units in the GTA.

Metro Toronto's housing make-up is heavily represented by high-rise at 35.8% and multiple family units at 48.6% (low-rise and high-rise combined). Metro Toronto has the highest number, but lowest percentage of single family dwellings at 33.2%. There is no major difference in household size within Metro Toronto, about 2.6 pph. However, Metro Toronto has more single family and 2 person households than the Regions, likely reflecting the median age of residents. Over the GTA 3Rs planning period, it is expected that there will be an increased desire for medium density and high-rise housing due to an aging population desiring less property responsibility.

Over the planning period, it is anticipated that Metro Toronto will also experience an increase in multiple family-type households due to infilling and redevelopment. However, Metro Toronto will capture fewer of the housing units compared to other GTA regions.

Employment

In 1991, Metro Toronto provided 1.37 million job opportunities, representing 60% of the job opportunities in the GTA and a growth of 14% since 1981. Metro Toronto employs the most workers in the GTA and is expected to do so to the year 2015. At that time, Metro Toronto is expected to be able to provide 1,639,000 employment opportunities.

In terms of type of employment, Metro Toronto is the highest employer in the commercial services sector at 22.6% of total employment. The next dominant source of employment are manufacturing and non-commercial services. With commercial and non-commercial services combined, the service industry is the major employer in Metro Toronto at 38%. Compared to the rest of the GTA, Metro Toronto had a smaller percentage of manufacturing and a greater proportion of employment in the finance, insurance and real estate sector (FIRE).

Only three areas have experienced employment growth since 1981: commercial and non-commercial services and finance, insurance and real estate. Manufacturing, transportation and wholesale industries have experienced significant declines.

Metro Toronto has more jobs than it has workers resulting in commuting from other Regions for employment. In 1991, Metro Toronto's labour force was 1.26 million. In contrast to the employment opportunities, the service sector continues to employ most (38.5%) Metro Toronto residents, representing an increase from 1981 to 1991. Like all other Regions, Metro has experienced a decrease in manufacturing opportunities.

In the future, its expected that there will be pressure to shift Metro Toronto's jobs to two categories: low pay, low skill, part-time; and high pay, high skill, full time.

Other trends predicted are that Metro Toronto will increasingly lose its attractiveness as a place to look for work compared to the Regions. However, Scenario 1 of the OGTA is intended to provide a reversal of this trend and promote significantly increased Metro Toronto employment opportunities. The highest labour force growth will be female, 35-65 age bracket. In addition, the overall participation rate in the labour force will increase but gradually level off.

4.3.4 York Region (Social Environment)

Demographic Characteristics

York Region is the third largest regional municipality in the GTA behind Metro Toronto and Peel Region. At 504,981 residents in 1991, York Region has 11.9% of the population of the GTA, with Markham and Vaughan being the largest municipalities in the Region. In 1988, 80% of York Region's residents lived in urban centres, 11.5% lived in rural centres and 8.5% lived in rural areas.

In the 1981 to 1986 period, York was the second fastest growing municipality, behind Peel. Within the GTA, York Region and the other regional municipalities are expected to absorb significantly greater growth than Metro Toronto over the GTA 3Rs planning period. Both Peel and York Regions are expected to grow fastest. By 2011, Durham, York and Peel are anticipated to capture approximately 77% of the growth in the GTA, with York expected to be the fastest growing of all Regions. By the end of the GTA 3Rs planning period, York is expected to have 997,161 residents.

In terms of cultural diversity, York Region is similar to Peel Region and close to the average of language groups in the GTA. For example, about 73.3% of York Region residents have English as their mother tongue compared to 71% of the GTA. York Region has a higher percentage of Italian speaking residents and a higher percentage of Chinese speaking residents. Both of these groups have grown proportionally to other groups over the last five years.

York Region has the highest percentage of young people in the 0-19 years age category; the highest percentage of people in the 35-54 age category. Compared to Metro Toronto, at 12.8%, York Region has relatively fewer people over the age of 65 (7.0%). In 1987, York Region had a Median Age of 29.7 for males (1986 Ontario average was 31.4) and 30.4 for females (1986 Ontario average was 33.1). This is expected to rise to 34.7 (2011 Ontario average will be 42.7) and 36.3 (2011 Ontario average will be 39.7) % to the year 2011. Overall, the Region will continue to have a younger population than the rest of the GTA over the long term.

Across the GTA, children and teenagers are expected to increasingly be raised in single-parent family households or blended family households (Canadian Urban Institute, 1991b). A growing proportion of families will be two income families, thus potentially reducing the time available for waste diversion activities. York Region has the highest average incomes of all Regions in the GTA for both 1981 and 1986.

Housing

As of 1991, York Region had 150,485 households with the largest number of households being located in Markham). York Region households are expected to increase to 330,831 by 2015. At 3.3 persons per household, York Region also has the highest number of people per household of all Regions in the GTA. Of all GTA Regions, York also has the highest rate of home ownership (82.5) and at lowest rate of rental housing at 17.6%.

Eighty percent (80%) of York Regions housing is single family dwellings; 9.2% is semi-detached, rowhousing and townhouses; 3.4% low-rise and 7.6% high-rise. By way of comparison, 45.7% of the GTA is single family dwellings and 27% of the housing is high-rise.

Due to preferences for an aging population to desire high-rise and multiple family dwellings, these housing types are expected to increase in the 1990s. The amount of higher density housing in York Region will increase to just over 18% of the housing stock toward the end of the planning period.

Employment

York Region provides 247,255 of the GTA's employment opportunities, or 10.9% of the jobs in the GTA. Since 1981, York Region had the greatest job growth in the GTA. The Region is expected to provide 566,132 jobs by the year 2015.

York Region's firms are more broadly focused compared to other Regions. At 21.1%, commercial services is the largest employer followed by manufacturing at 20.1% and retail services at 13.9%. Since 1981, York Region has seen a decline in primary industries (agriculture), manufacturing and transportation. Areas of significant increase are captured growth in the office sector.

In contrast to employment, the service sector employs over 34% of the Region's residents followed by the wholesale sector at 20% and manufacturing at 15.4%.

4.3.5 Peel Region (Social Environment)

Demographic Characteristics

Behind Metro Toronto, Peel Region is the second most populated Region in the GTA, with 732,798 residents in 1991. Over 63% of Peel's residents are located in Mississauga.

Both Peel and York Regions are expected to grow the fastest over the GTA 3Rs planning period. Like York Region, Peel has experienced more than double the growth rate of Metro Toronto.

Population projections for Peel indicate that by 2015, using OGTA Scenario 1 assumptions, the Region is expected to have 1,192,798 residents. This will be consistent with the expectation that even with the intensification of Metro, the Regions outside of Metro will absorb most of the future growth of the GTA.

By language, English is still the largest language group, however, the frequency of English as a mother tongue had declined by 1991 to 72.8%. The second major language group is Italian (3.8%) followed by Portuguese (3.2%). The two fastest growing language categories are Chinese and Polish.

Compared to other Regions in the GTA, Peel Region has a higher Portuguese population (by mother tongue) and the diversity of other language groups mirrors the diversity of the GTA.

Peel Region has proportionally more children (30.0%) than the GTA overall (26.0%). Along with Durham Region, Peel has a low percentage of older people with 7% being between the ages of 55 and 64 and 6.4% over 65 years of age compared to 8.8% and 10.3% respectively for the GTA.

Peel Region residents have household incomes that are average compared to the other Regions with 1986 average household incomes of $46,630.

Housing

In 1991, Peel Region had 229,670 households. Most of the households are located in Mississauga. Peel Region has more people per household compared to other Regions, reflecting younger families and extended family structures associated with some of Peel's cultural groups.

At 68.3%, Peel Region has the second lowest rate of home ownership (31.6% rental) for the GTA Regions. The majority of Peel's dwellings are single detached, although Peel Region also has the highest percent of semi's, townhomes and row housing. The Region also has a higher proportion of high-rises (23.3%) than the other Regions (excluding Metro).

Peel is expected to have 417,119 households by the year 2015, making it the second largest municipality behind Metro Toronto. The robust household growth expected over the planning period will include a near doubling of the numbers of single family detached and high-rise dwellings.

Employment

Peel Region employment (jobs based in Peel Region) in 1991 stood at approximately 380,000 jobs. While Peel Region is a distant second to Metro Toronto in terms of employment opportunities in the GTA, it has almost twice the number of jobs in Durham and Halton Region. Most of Peel's employment growth from 1981 to 1993 has been in the transportation, communication and utilities, retail, finance, insurance and real estate and commercial service sectors. Peel has experienced employment losses in the manufacturing and wholesale sectors over the same time period.

The number of employees is expected to increase to 629,021 jobs by the year 2015. By the year 2015, both York and Peel Regions are expected to offer considerable employment opportunities within the GTA. Peel is expected to capture 19% and York Region an additional 15% of the employment growth in the Greater Toronto Area.

Labour force data (employed residents who may work in Peel or elsewhere) indicate the sectors in which Peel residents work. Peel Region had a labour force of 427,895 in 1991. Labour force employment in manufacturing and has decreased considerably since 1981. Most of the labour force growth has been in the service sector. Peel has more residents employed in manufacturing than other Regions.

4.4 Existing Residential and IC&I 3Rs System

The residential 3Rs waste diversion systems in each of the GTA regional municipalities and the IC&I 3Rs systems for the GTA which were in place at the end of 1992 are described in the following sections. This is referred to as the Existing System for this study. System costs are also described.

System costs refer to the combined cost of diversion plus disposal. For each region, except Halton, a high and low system cost is provided. Costs are based on disposal fees of $50/tonne and $100/tonne with a third $85/tonne disposal fee also estimated for IC&I waste disposal. The variation in disposal rates assumed for system cost estimates, impacts on overall system costs, reflecting in the high and low figures presented. Halton costs are based on a disposal fee of $150/tonne.

4.4.1 Durham Region

4.4.1.1 Existing Residential 3Rs System Description

In 1992, an estimated 140,078 tonnes of residential waste were generated in Durham. Of this, 36,987 tonnes were diverted and 103,091 tonnes disposed for an estimated residential waste diversion rate of 26%. If this system were to remain in place to the year 2000, it would achieve a diversion rate of 26% (with 3% source reduction). Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	17,166 tonnes
Dry recyclables from depots	2,077 tonnes
Other dry recyclables diverted	5,905 tonnes
Leaf and yard waste	8,045 tonnes
Household wet waste through backyard composters	3,794 tonnes
Total diverted 1992	36,987 tonnes

The following tonnages of recyclable materials were collected:

- 12,377 tonnes of Old News Papers (ONP) and Old Magazines and Catalogues (OMG) (commingled);
- 1,411 tonnes of OCC;
- 115 tonnes of telephone directories;
- 2,443 tonnes of aluminum and steel (commingled);
- 4,211 tonnes of Glass;

- 155 tonnes of polyethylene terephthalate (PET);
- 284 tonnes of fine paper (not colour separated, collected only from Region and Municipal offices and a few IC&I locations, program was discontinued in 1993).

This information is summarized in Table 4.4.

In 1992, residential recycling services in Durham Region consisted of the following activities:

- 101,576 single family households were provided with bi-weekly curbside collection of Blue Box recyclables;
- rural residences were served by depots and containers situated throughout the Region;
- Igloos and domes provided opportunities to recycle in public areas;.
- 22,450 backyard composters had been distributed to single-family dwellings;
- extensive promotion and education programs;
- curbside pick-up of leaf and yard waste in several municipalities;
- one regional leaf and yard waste composting site;
- re-use activities by Goodwill Industries (clothes, durable goods, etc.);
- one attended donation centre at Ritson Transfer Station;
- two permanent HHW depots, including Brock West landfill (operated by Metro), Oshawa transfer station;
- the Toxic Taxi service was discontinued in the fall of 1992; and
- one MRF (the Durham Recycling Centre) owned and operated by Durham Region.

TABLE 4.4
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
REGION OF DURHAM
1992

Regional Characteristics	
Regional Population	421,014
Total Number of Households	148,831
- single family detached - high-rise - semi and low-rise	97,269 11,275 32,287
Households served by curbside	101,576
Households severed by depot	22,400
Number of backyard composters distributed	22,450
Residential Material Diverted in 1992	
Blue Box	17,166 tonnes
Depots (Blue Box materials)	2,077 tonnes
Other materials	5,905 tonnes
Leaf and yard waste collection and composting	8,045 tonnes
Diversion through backyard composters	3,794 tonnes
Total residential waste diverted	36,987 tonnes
Residential Waste Diversion Summary	
Residential Waste generated	140,078 tonnes
Residential Waste diverted	36,987 tonnes
Residential Waste disposed	103,091 tonnes
Residential Waste diversion rate	26%

Source: Data obtained from Region of Durham staff
Population and household data: Social Environmental Technical Appendix, May 1994
Backyard composter diversion data: Service Technical Appendix, May 1994

These activities are described in detail in the Service Technical Appendix. Waste flow for the Existing system is shown schematically in Figure 4.1.

The 3Rs components contained within the Durham Region Existing system are presented in Table 6.5 located in Chapter 6.0.

4.4.1.2 Durham Region - Costs

The total system cost (diversion plus disposal) for the Existing system ranges from \$117 to \$153/household/year, based on disposal fees of \$50 and \$100/tonne (Cost Technical Appendix).

4.4.2 Metro Toronto

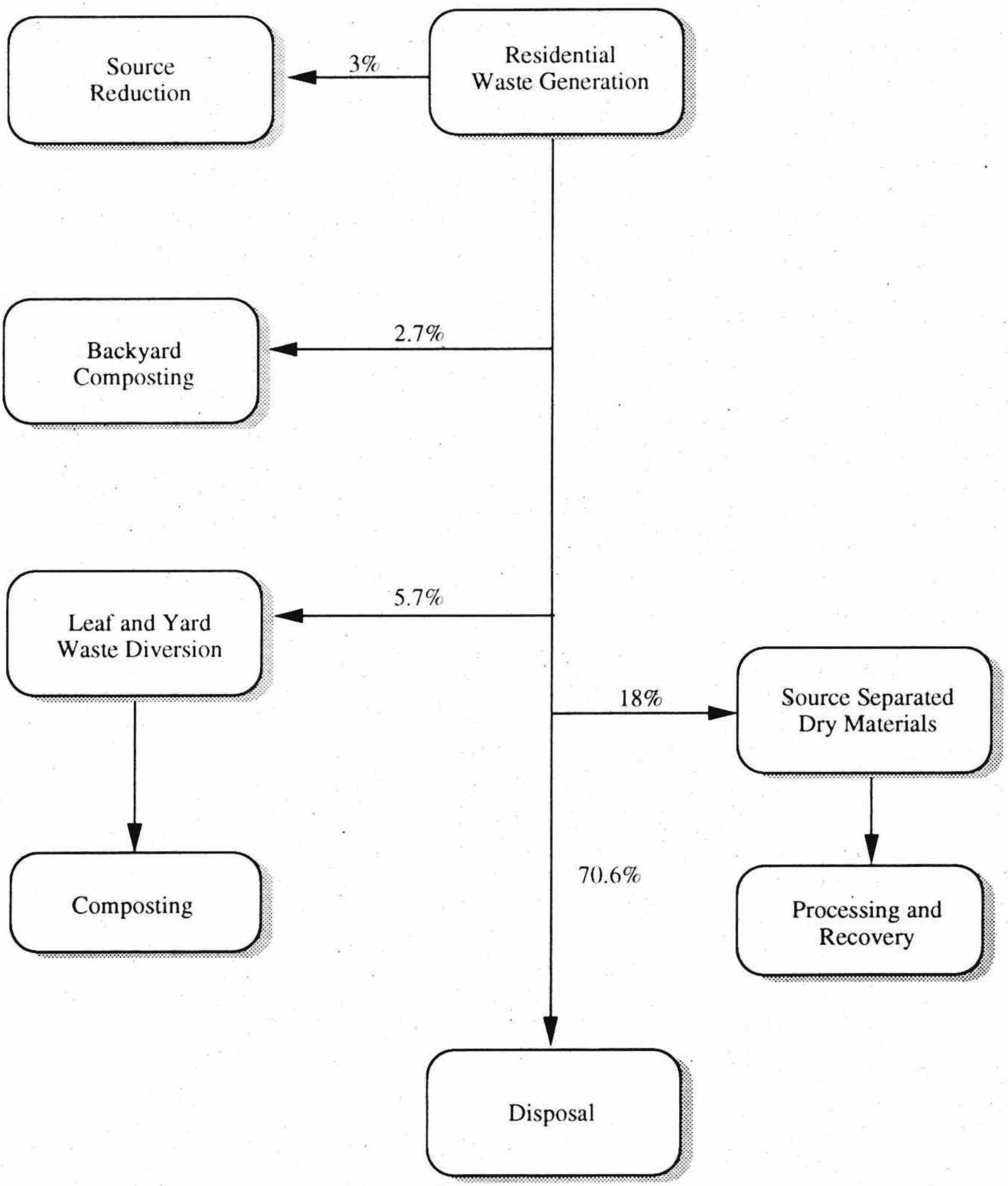
4.4.2.1 Existing Residential 3Rs System Description

In 1992, an estimated 1,069,790 tonnes of residential waste (which includes some commercial and municipally generated waste) were generated in Metropolitan Toronto. Of this, 201,177 tonnes were diverted and 868,613 tonnes disposed for an estimated residential waste diversion rate of 19%. This system could achieve diversion of 19% to 22% (with 3% source reduction) by the year 2000. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	99,671 tonnes
Dry Recyclables from depots	2,611 tonnes
Large appliances/scrap metal (other)	9,413 tonnes
Leaf and yard waste	71,062 tonnes
Household wet waste through backyard composters	17,745 tonnes
HHW	675 tonnes
TOTAL DIVERTED 1992	201,177 tonnes.

Figure 4-1

Region of Durham
Residential System 1 — Existing



In 1992, approximately 112,370 tonnes were collected from the Blue Box programs and depots operating in all of the municipalities in Metropolitan Toronto in 1992 including:

- 57,995 tonnes of ONP and OMG (commingled);
- 2,786 tonnes of OCC;
- 1,098 tonnes of Telephone Directories;
- 23,789 tonnes of Glass;
- 18,314 tonnes of Steel (including scrap metal and white goods);
- 387 tonnes of aluminum;
- 635 tonnes of PET;
- 1,141 tonnes of HDPE;
- 5,550 tonnes of Metal, Wood, Tires, Textiles, etc.;
- 675 tonnes HHW.

All municipalities offered residents weekly curbside pickup, except the City of Toronto which operated a unique program that collected paper and container material on alternate weeks.

This information is summarized in Table 4.5.

In 1992, residential recycling services in Metro Toronto consisted of the following activities:

- residential curbside recycling services to 704,000 households;

- igloos and domes in public areas;

- 105,000 backyard composters;

- 25 large 3-bin composting units for apartments and cooperative housing complexes;

- Recycling service to approximately 65% of units in multi-family buildings;

- 6 leaf and yard waste composting facilities operated by Metro or municipalities;

- 3 MRFs processing container and fibre materials;

TABLE 4.5
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
METRO TORONTO
1992

Regional Characteristics	
Regional Population	2,298,798
Total Number of Households	875,021
- single family detached - high-rise - semi and low-rise	289,330 315,283 270,408
Households served by curbside	704,000
Number of backyard composters distributed	105,000
Residential Material Diverted in 1992	
Blue Box	99,671 tonnes
Depots (Blue Box materials)	2,611 tonnes
Other materials	10,088 tonnes
Leaf and yard waste collection and composting	71,062 tonnes
Diversion through backyard composters	17,745 tonnes
Total residential waste diverted	201,177 tonnes
Residential Waste Diversion Summary	
Residential Waste generated	1,069,790 tonnes
Residential Waste diverted	201,177 tonnes
Residential Waste disposed	868,613 tonnes
Residential Waste diversion rate	19%

Source: Household and population data: Social Environment Technical Appendix, May 1994
Diversion data obtained from regional and municipal staff
Backyard composter diversion data: Service Technical Appendix, May 1994

- Goodwill Industries operates 10 "Attended Donation Centres," 20 stores for donating clothing and small items and a training facility for repairing mattresses, furniture, small engines;

- ReUze Centre in Scarborough;

- Second Harvest, a non profit organization that acts as a broker between sources of surplus perishable food and social service organizations that can use it;

- 10 permanent HHW depots - eight in Metro, one at the Keele Valley landfill and one at the Brock West Landfill, each operated for 2 days per week;

- two toxic taxis operated 6 days per week to residents with a minimum of 10 litres of HHW for disposal;

- curbside collection of white goods in East York, Etobicoke and York;

- drop-off depot for white goods in Etobicoke;

- pilot wet collection program;

- extensive advertising, education and promotion, including a general information hotline operated by Metro Toronto; and

- landfill bans on OCC, office paper, tires, drywall, scrap metal, surplus goods, off-specification goods, excavated material and wood.

These activities are described in detail in the Service Technical Appendix. Waste flow for the Existing system is shown schematically in Figure 4.2

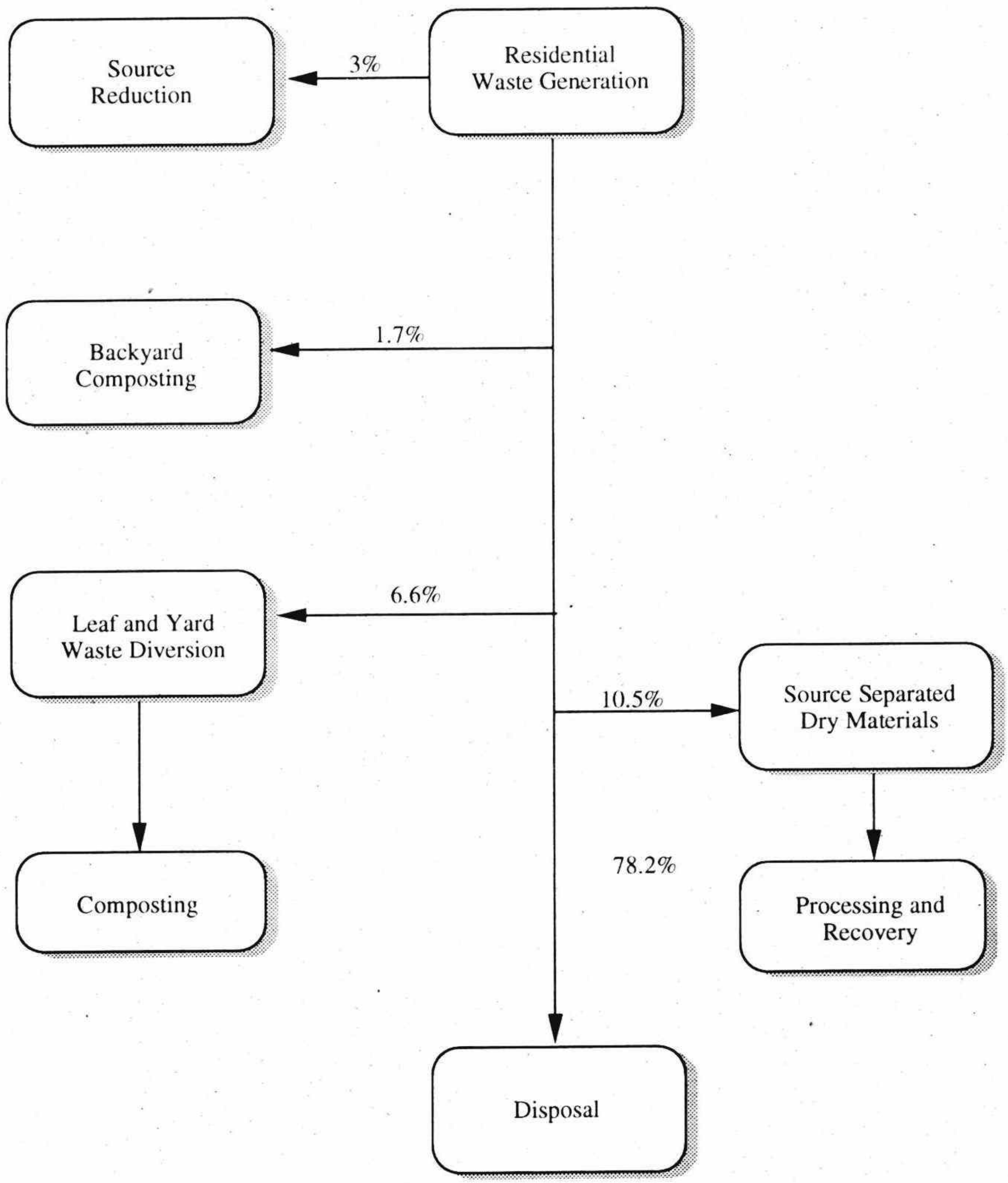
The 3Rs components contained within the Metro Toronto Existing system are presented in Table 6.6 located in Chapter 6.0.

4.4.2.2 Metro Toronto - Costs

The total system cost (diversion plus disposal) for the Existing system is estimated to range from $139 to $187/tonne based on disposal fees of $50 and $100/tonne (Cost Technical Appendix).

Figure 4-2

Metropolitan Toronto
Residential System 1 — Existing



4.4.3 York Region

4.4.3.1 York Region - Existing Residential 3Rs System Overview

In 1992, an estimated 196,250 tonnes of residential waste were generated in York Region. Of this, 54,101 tonnes were diverted and 142,150 tonnes disposed for an estimated residential waste diversion rate of 28%. This system could achieve a diversion rate of 28% to 31% (with 3% source reduction) if in place in the year 2000. Estimated residential waste diversion was made up of the following activities:

Dry recyclables	25,433 tonnes
Other materials	7,458 tonnes
Leaf and yard waste	16,300 tonnes
Household wet waste through backyard composters	4,909 tonnes
TOTAL DIVERTED 1992	54,100 tonnes.

The following tonnages of materials were collected from residential recycling programs in the Region in 1992:

- 16,641 tonnes of ONP and OMG (commingled);
- 677 tonnes of OCC;
- 75 tonnes of telephone directories;
- 69 tonnes of mixed paper;
- 91 tonnes of aluminum;
- 2,796 tonnes of tinplate steel;
- 5,770 tonnes of glass;
- 282 tonnes of PET;
- 404 tonnes of high density polyethylene (HDPE); and
- 6,087 tonnes of metal, wood, tires, textiles etc.

This information is summarized in Table 4.6.

In 1992, residential recycling services in York Region consisted of the following activities:

- 159,507 households were provided with curbside collection of Blue Box recyclables. All municipalities offered curbside collection;

TABLE 4.6
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
YORK REGION
1992

Regional Characteristics	
Regional Population	524,296
Total Number of Households	161,654
- single family detached - high-rise - semi and low-rise	128,466 13,283 19,905
Households served by curbside	159,507
Number of backyard composters distributed	29,050
Residential Material Diverted in 1992	
Blue Box	25,433 tonnes
Other materials	7,458 tonnes
Leaf and yard waste collection and composting	16,300 tonnes
Diversion through backyard composters	4,909 tonnes
Total residential waste diverted	54,100 tonnes
Residential Waste Diversion Summary	
Residential Waste generated	196,250 tonnes
Residential Waste diverted	54,100 tonnes
Residential Waste disposed	142,150 tonnes
Residential Waste diversion rate	28%

Source: Diversion data were obtained through a survey of the nine lower tier municipalities in York Region, and also through discussions with operators of the Richmond Hill and Markham MRFs, and the regional leaf and yard waste composting site.
See Metro rate on backyard composters.
Household and population data: Social Environment Technical Appendix, May 1994.

- Markham also collected materials from recycling depots - no figures on exact quantities are available. The depots accepted all Blue Box materials, plus boxboard, mixed paper, scrap metal and tires. Whitchurch-Stouffville was the only other municipality reporting any depot collection;

- 29,050 backyard composters were distributed;

- extensive promotion and education programs;

- one regional leaf and yard waste composting site;

- seasonal curbside collection of leaf and yard waste and drop-off at the regional composting site

- periodic HHW collection days;

- two mobile HHW depots;

- periodic curbside collection of white goods;

- drop-off depot for white goods collection at King Township landfill (for King residents); and

- two MRFs, one owned by Markham and the other owned by Richmond Hill. Both are operated by Miller Waste Systems Ltd.;

These activities are described in detail in the Service Technical Appendix. Material flow for the Existing system is shown schematically in Figure 4.3.

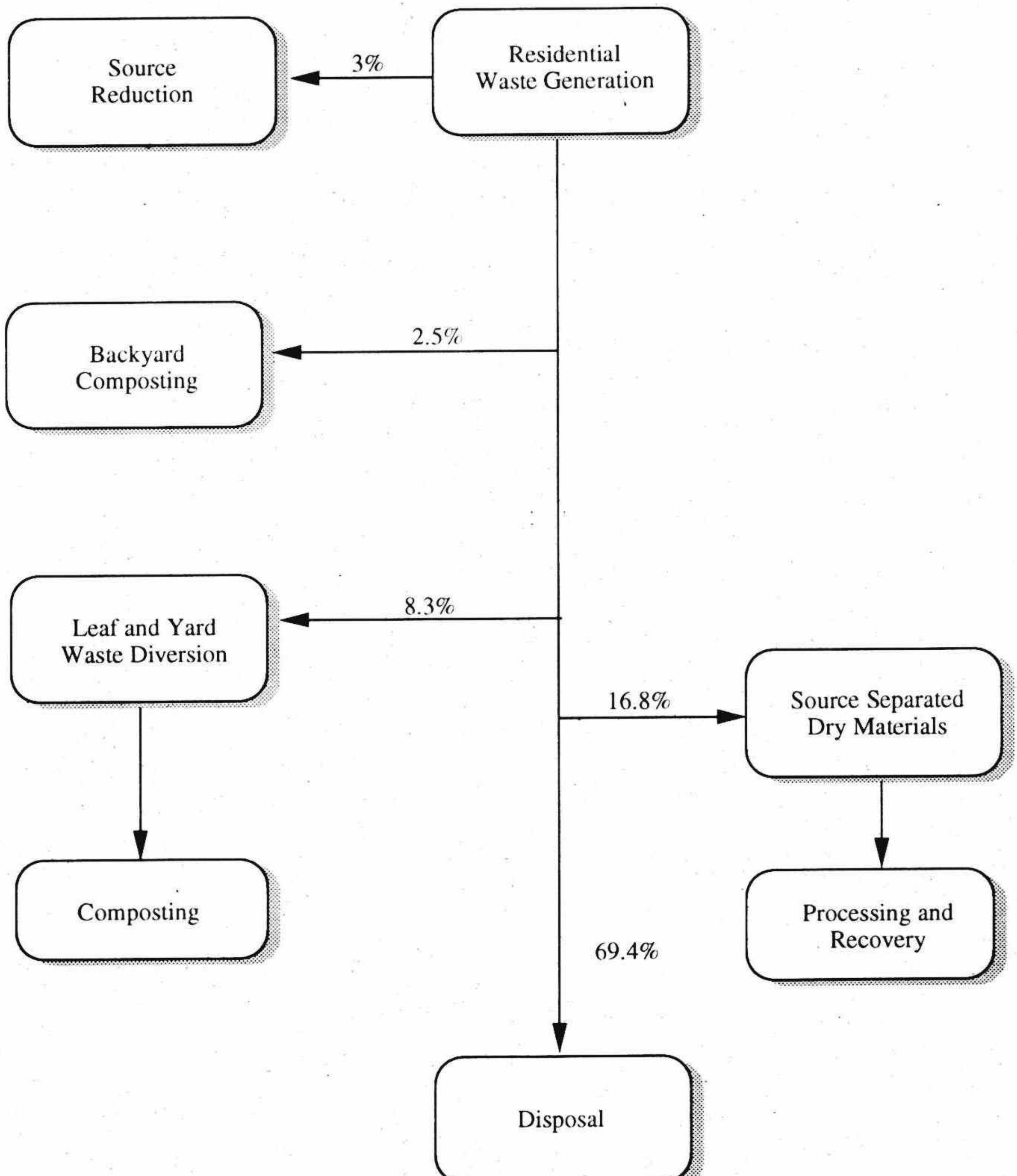
The 3Rs components contained within the York Region Existing system are presented in Table 6.7 located in Chapter 6.0.

4.4.3.2 York Region - Costs

The total system cost (diversion plus disposal) for the Existing system is estimated to range from \$130 to \$173/tonne, based on disposal costs of \$50 and \$100/tonne (Cost Technical Appendix).

Figure 4-3

Region of York
Residential System 1 — Existing



4.4.4 Peel Region

4.4.4.1 Existing Residential 3Rs System Overview

In 1992, an estimated 313,296 tonnes of residential waste were generated in Peel Region. Of this, 59,967 tonnes were diverted and 253,329 tonnes disposed for an estimated residential waste diversion rate of 19%. A diversion rate of 19% to 22% (with 3% residential source reduction) could be achieved by this system by the year 2000. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	34,867 tonnes
Dry Recyclables from depots	5,793 tonnes
Other Dry Recyclables diverted	1,375 tonnes
Leaf and yard waste	7,661 tonnes
Household wet waste through backyard composters	9,606 tonnes
Household Hazardous Waste	665 tonnes
TOTAL DIVERTED 1992	59,967 tonnes

The following tonnages of materials were collected from residential Blue Box programs and drop-off depots in the Region:

- 21,534 tonnes of ONP and OMG (commingled);
- 1,234 tonnes of OCC;
- 712 tonnes of telephone directories;
- 469 tonnes of mixed paper;
- 6,137 tonnes of aluminum and steel (commingled);
- 6,674 tonnes of glass;
- 694 tonnes of plastic;
- 5,246 tonnes of metal, wood, tires, textiles, etc.

This information is summarized in Table 4.7.

In 1992, residential recycling services in Peel Region consisted of the following activities:

- residential curbside recycling services to 228,300 households;
- drop-off depots at Britannia Road landfill;
- 56,840 backyard composters;

TABLE 4.7
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
PEEL REGION
1992

Regional Characteristics	
Regional Population	755,178
Total Number of Households	236,775
- single family detached - high-rise - semi and low-rise	117,152 55,039 64,584
Households served by curbside	228,300
Number of backyard composters distributed	56,839
Residential Material Diverted in 1992	
Blue Box	34,867 tonnes
Depots (Blue Box materials)	5.793 tonnes
Other materials	2,040 tonnes
Leaf and yard waste collection and composting	7,661 tonnes
Diversion through backyard composters	9,606 tonnes
Total residential waste diverted	59,967 tonnes
Residential Waste Diversion Summary	
Residential Waste generated	313,296 tonnes
Residential Waste diverted	59,967 tonnes
Residential Waste disposed	253,329 tonnes
Residential Waste diversion rate	19%

Source: Household and population data: Social Environment Technical Appendix, May 1994
Diversion data obtained from regional and municipal staff
Backyard composter diversion data: Service Technical Appendix, May 1994

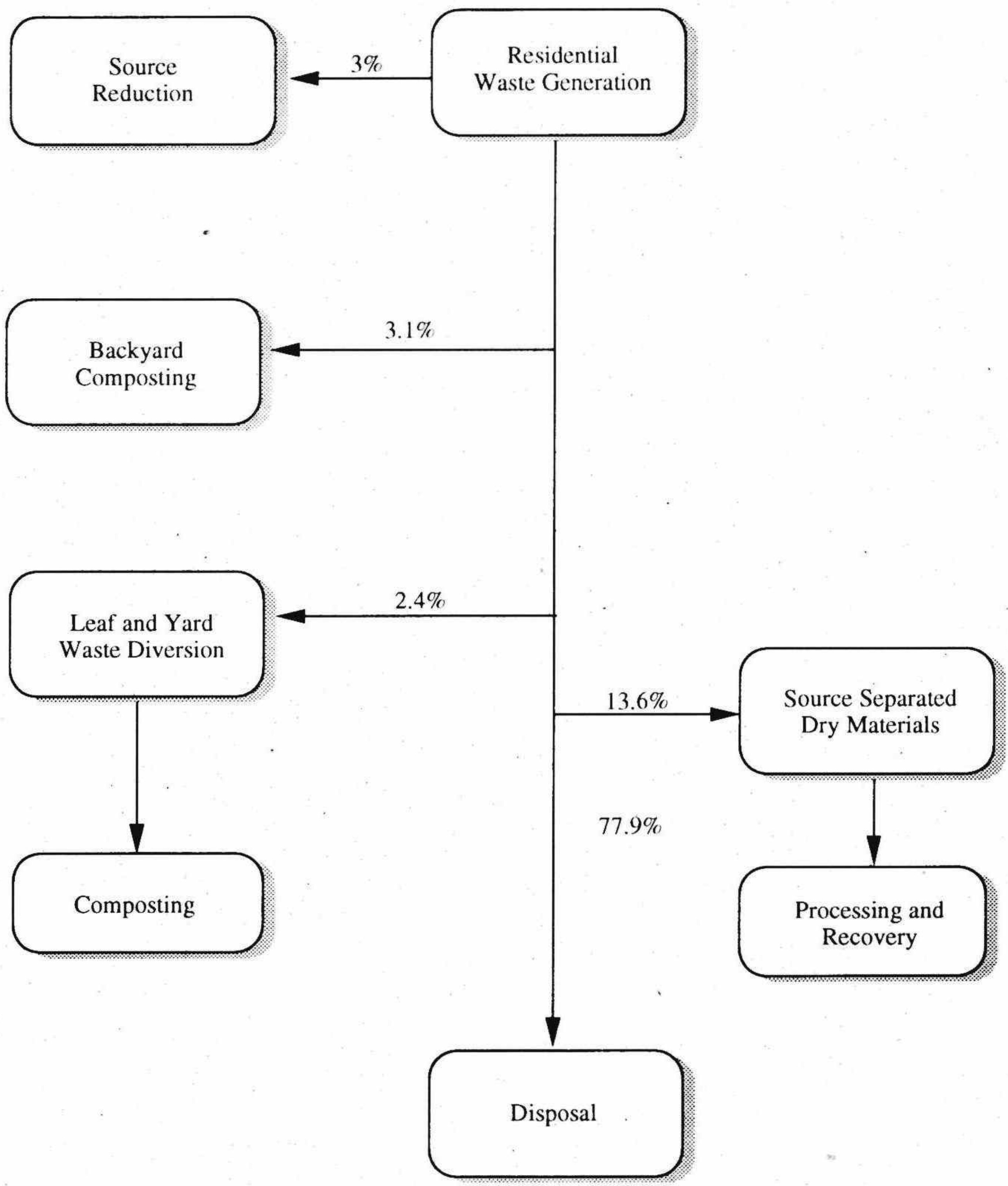
- leaf and yard waste composting site in Brampton;
- composting area at Britannia Road landfill site;
- compost demonstration site for pilot wet-dry projects;
- compost area at Caledon landfill;
- a regional salvage centre in Caledon;
- Albion Reusable Goods Exchange;
- Williams Parkway Reusable Goods Exchange in Brampton;
- one permanent household hazardous waste depot at the Britannia Road landfill;
- once-a-year HHW collection at Bolton Community Centre;
- HHW depot located in City of Brampton;
- drop-off depot for white goods in Caledon;
- curbside pick-up of white goods in Brampton and Mississauga;
- extensive promotion and education program;
- MRF/transfer station in Bolton for Caledon material;
- recyclable material processing at the Laidlaw MRF in Mississauga for Mississauga and Brampton material; and
- limited curbside collection of leaf and yard waste.

The activities are described in detail in the Service Technical Appendix. Material flow for the Existing System is shown schematically in Figure 4.4.

The 3Rs components contained within the Peel Region Existing system are presented in Table 6.8 in Chapter 6.0.

Figure 4-4

Region of Peel
Residential System 1 — Existing



4.4.4.2 Peel Region - Costs

The total system cost (diversion plus disposal) for the Existing system is estimated to range from \$126 to \$178/household/year based on disposal costs of \$50 and \$100/tonne (Cost Technical Appendix).

4.4.5 Halton Region

4.4.5.1 Halton Region - Existing Residential 3Rs System Overview

In 1992, an estimated 135,193 tonnes of residential waste were generated in Halton Region. Of this, 46,393 tonnes were diverted and 88,800 tonnes disposed for an estimated residential waste diversion rate of 34%. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	23,450 tonnes
Dry Recyclables from depots	3,600 tonnes
Leaf and yard waste	15,000 tonnes
Household wet waste through backyard composters	4,343 tonnes
TOTAL DIVERTED 1992	46,393 tonnes.

The following tonnages of materials were collected from residential Blue Box programs and drop-off depots in the Halton Region in 1992:

- 15,923 tonnes of ONP and OMG (commingled);
- 2,177 tonnes of OCC;
- 3,650 tonnes of Aluminum, Steel and Plastic (commingled);
- 4,944 tonnes of Glass; and
- 2,268 tonnes of Leaf and Yard Waste.

This information is summarized in Table 4.8.

In 1992, residential recycling services in Halton Region consisted of the following activities:

- residential curbside recycling services to 116,320 households;

TABLE 4.8
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
HALTON REGION
1992

Regional Characteristics	
Regional Population	322,467
Total Number of Households	111,586
- single family detached - high rise - semi and low-rise	73,258 16,374 21,954
Households served by curbside	116,320
Number of backyard composters distributed	25,700
Residential Material Diverted in 1992	
Blue Box	23,450 tonnes
Depots (Blue Box materials)	3,600 tonnes
Leaf and yard waste collection and composting	15,000 tonnes
Diversion through backyard composters	4,343 tonnes
Total residential waste diverted	46,393 tonnes
Residential Waste Diversion Summary	
Waste generated	135,193
Waste diverted	46,393
Waste disposed	88,800
Waste diversion rate	34%

Source: Household and population data: Social Environment Technical Appendix
Diversion data obtained from regional and municipal staff
Backyard composter diversion data: Service Technical Appendix

- four drop-off depots throughout Region;
- regional MRF to process recyclables;
- 25,700 backyard composters;
- leaf and yard waste composting at several different privately owned facilities throughout the Region and municipal site in Oakville;
- WASTEWISE goods exchange and recycling depot;
- curbside and drop-off services for white goods; and
- extensive promotion and education program.

These activities are described in detail in the Service Technical Appendix. The Existing system achieves 34% diversion of residential waste. This system could achieve 34% to 37% diversion of residential waste (with 3% source reduction) by the year 2000. Material flow for the Existing system is shown in Figure 4.5.

The 3Rs components contained within the Halton Region Existing system are presented in Table 6.9 in Chapter 6.0.

4.4.5.2 Halton Region - Costs

The existing Halton waste management system costs (diversion plus disposal) is estimated at $184/household/year (Cost Technical Appendix).

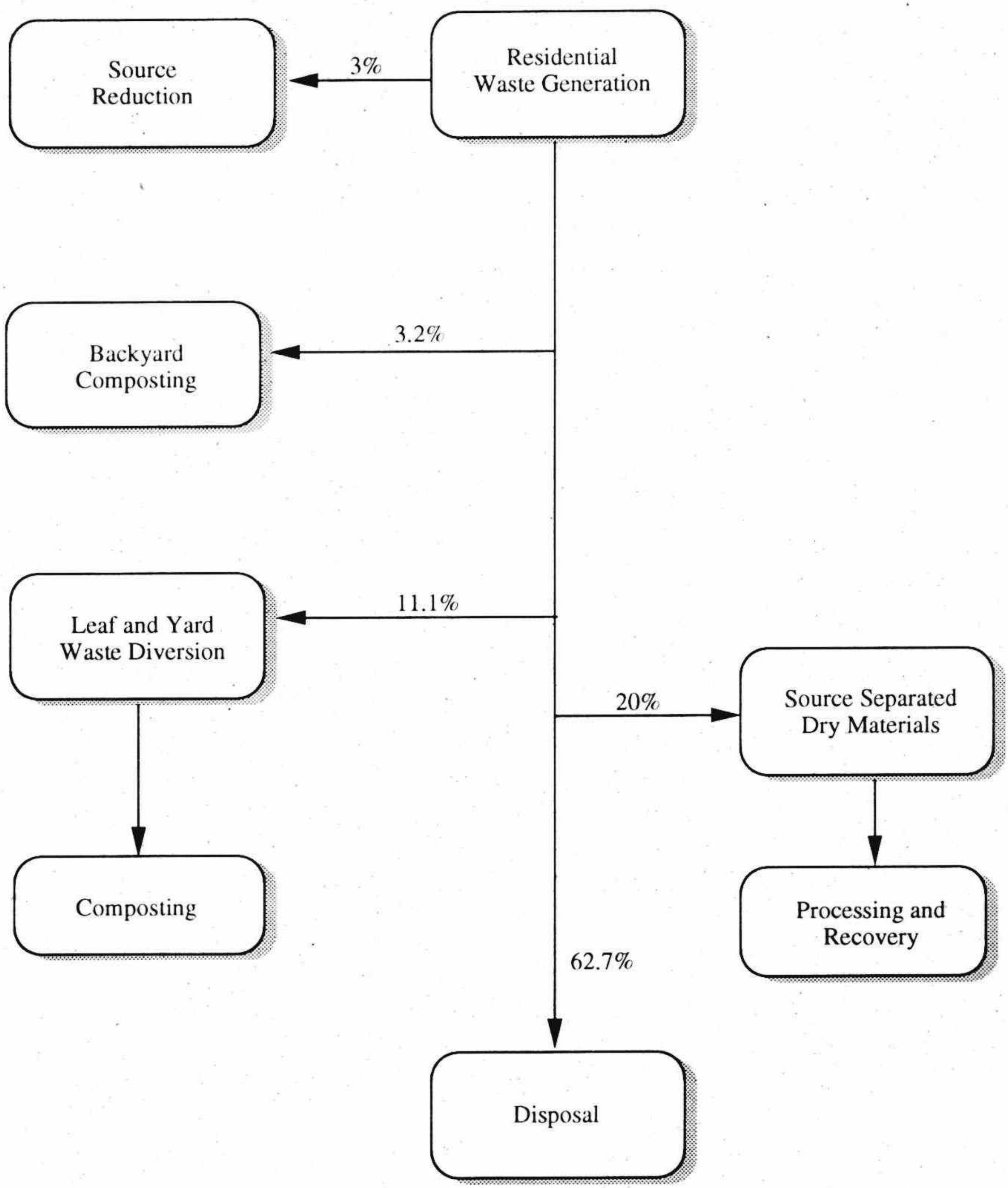
4.4.6 <u>IC&I</u>

4.4.6.1 GTA - Existing IC&I 3Rs System Overview

This system is based on the IC&I waste management system which was in place in GTA at the end of December 1992. At that time, waste diversion by the IC&I sector was carried out on a voluntary basis. Tipping fees at GTA landfills were $150/tonne for the private sector, causing significant export of waste to the U.S. A number of landfill bans throughout the GTA also limited the materials which could be disposed in landfills (e.g. wood, tires, drywall, scrap metal, white goods, fine paper, etc.).

Figure 4.5

Region of Halton
Residential System 1 — Existing



Opportunities to recycle were provided to small IC&I generators through some municipally run depots. Two municipalities (Caledon and City of Toronto) provided some municipal collection of IC&I recyclables. Processing of some IC&I recyclables was also provided by some municipally-run MRFs.

Collection and processing of a wide range of source separated dry recyclables from the IC&I sector was provided by many private sector haulers and recyclers, some of which owned and operated processing facilities.

Collection and processing of wet wastes generated by the IC&I sector was provided by the private sector (e.g. centralized windrow composting - Scott's Farm, rendering of food wastes, collection by farmers for landspreading and animal feed, etc.). In addition, redistribution of food wastes from the IC&I sector was carried out through organizations such as Second Harvest and food banks.

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, WASTEWISE, Halton, etc.)

Voluntary waste reduction initiatives were pursued by individual IC&I establishments. These include implementation of source separation and recycling programs, carrying out waste audits, and developing waste reduction action plans, which included reduction, reuse and recycling elements.

The National Packaging Protocol (NAPP), a federal initiative, required that packaging waste generation be reduced by 50% by the year 2000, measured against a 1988 baseline. NAPP is a voluntary program at this time. Private sector companies were complying with the spirit of NAPP on a voluntary basis as of the end of 1992.

Management of IC&I waste in the GTA is carried out mostly by private sector haulers, recyclers, brokers and processors. Material is sold to end markets both within and outside the area.

There are over 220 private sector companies providing a range of hauling, processing and marketing services for IC&I wastes in the GTA. A complete listing of all IC&I recycling companies in GTA is available through the RCO. A profile of the number of companies covering the range of IC&I waste materials is provided in Table 4.9 (Reference: RCO, "Secondary Material Markets Directory," 1992).

TABLE 4.9
ESTIMATED NUMBER OF GTA RECYCLING COMPANIES INVOLVED IN MANAGEMENT OF DIFFERENT MATERIALS, 1992

Material	Number of GTA Companies that Haul, Market the Material
Asphalt and Concrete	21
Construction and Demolition	19
Drum Reconditioning	10
Drywall	24
Food and Beverage Cans	31
Food and Organic Waste	20
Glass	22
Scrap Metal Recovery	57
Paper Products	89
Plastics	68
Social Service Organizations	9
Textiles	9
Tires	18
Wood	63

Source: Recycling Council of Ontario "Secondary Material Markets Directory" 1992.
*Note: The number of services shown adds to greater than the total of 220 because several companies provide multiple services.

4.4.6.2 Waste Exchange, Reuse, Promotion and Education Activities

Waste Exchange

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, the Re-Uze Centre, Scarborough, WASTEWISE, Halton, etc.) to the IC&I sector in the GTA.

The Ontario Waste Exchange (OWE) assists waste generators to identify markets for their waste materials. In 1992, OWE handled approximately 56,000 tonnes of materials. The proportion of these generated by GTA companies is not known. Since start-up in 1987, OWE has handled a total of approximately 220,000 tonnes of waste materials in the Province.

Promotion and Education

Metro Toronto and Peel provide promotion and education that is focused on the IC&I sector and is summarized below.

Metro Toronto

- over 300 waste audits were conducted in 1990;
- produced a guide to develop a commercial and industrial waste reduction and recycling plan;
- produced a market directory of facilities recycling banned materials;
- produced an office paper recycling guide;
- produced an educational kit for schools; and
- established an IC&I information hotline which handled 6,000 inquiries in 1991. Discussions with Metro have revealed that the telephone hotline is now receiving 400 calls per month.

Peel

- approximately 10,000 posters were distributed to the IC&I sector to encourage businesses to become environmentally-conscious;
- 147 waste audits were performed by regional staff by 1991, in addition to visits advising companies in the 3Rs;
- the Region supports a general recycling telephone hotline that also accepts IC&I questions;
- the Region holds an annual day-long seminar including presentations and awards for outstanding achievements in waste reduction;
- the Region publishes a directory of recycling markets;
- the Region liaises with industry associations to promote 3Rs programs;

- the Region provides research and development assistance for companies with new waste reduction initiatives; and

- the Region provides education programs to schools with assistance of a Joint Committee for the Environment of the Separate and Public Boards of Education in Peel.

4.4.6.3 Current IC&I Waste Diversion Activities in GTA

Information on waste diversion activities by IC&I waste generators in GTA has been gathered from published articles, previously published studies and documented success stories. The study team also conducted a telephone survey of associations representing industrial and commercial groups as well as individual waste generators in each GTA Region in February and March, 1993.

The results of this survey (summarized in the Service Technical Appendix) indicated that 3Rs activity varies widely among all sectors so that general statements on recycling rates are difficult. However, awareness of potential opportunities for waste reduction and recycling is growing in the IC&I sector. Significant results have been achieved in specific IC&I establishments in virtually every sector.

Industry associations have served as information sources on environmental and recycling measures for their memberships. Some have conducted surveys of initiatives within their membership, but they do not generally have a comprehensive picture of recycling activity within the whole sector.

The Ontario Waste Management Association (OWMA) also conducted a survey of its membership in March, 1991 which estimated that the IC&I diversion rate for the GTA was 17.8% and was expected to reach 23.7% in September, 1991.

4.4.6.4 Components of IC&I 3Rs System

The components of the existing GTA IC&I 3Rs system are described below. They include components for collection and processing of dry and wet waste, source reduction, material reuse and promotion and education:

- voluntary source separation of dry recyclables and organics by some IC&I generators;
- collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers, with curbside collection by municipal forces in some areas (City of Toronto, Caledon);
- IC&I depots at transfer stations for use by small business generators;
- landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.);
- separate collection of IC&I wet wastes;
- processing of specific dry materials (e.g. C&D wastes, wood, drywall, etc.) in specially designed facilities;
- processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff (Laidlaw MRF, Mississauga; WMI MRF, Etobicoke; or BFI MRF, Concord), municipal MRFs and/or by small private sector recyclers;
- centralized windrow and/or in-vessel composting of source-separated IC&I organics (Scott's Farm);
- on-site composting of source separated organics by some generators, with vermi-composting at some IC&I locations;
- rendering, landspreading and reuse of food waste as animal feed by some operators;

- use of food waste for human consumption;
- material reuse through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham Region) with community-based reuse programs for small IC&I generators (WASTEWISE, Halton);
- refilling of IC&I containers (e.g. refillable bottles, refillable pails or drums, etc.) and reusable packaging (e.g. reusable plastic and wood pallets);
- voluntary waste reduction actions by IC&I generators (e.g. waste audits, developing waste reduction programs);
- voluntary reduction of packaging waste by 50% by the year 2000 (NAPP) with reporting to federal authorities;
- promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality (e.g. Metro Toronto Information Hotline);
- promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO) and industry associations.

The components are listed in more detail in Table 6.10 located in Chapter 6.0.

4.4.6.5 Diversion Achieved by Existing IC&I System

It is estimated (through a material by material methodology presented in the Service Technical Appendix) that approximately 28% of the IC&I waste generated in 1992 was diverted. It is estimated that approximately 33% of the IC&I waste generated could be diverted by the year 2000, including source reduction. The estimated composition and the diverted and disposed waste stream in each case is presented in the Service Technical Appendix.

4.4.6.6 Existing IC&I System Costs

Costs for each IC&I system were estimated using disposal fees of $50, $85 and $100/tonne. Estimated system costs for the Existing IC&I system are $335 million (at $50/tonne), $416 million (at $85/tonne) and $451 million (at $100/tonne). A full description of the assumptions and this analysis are presented in the Cost Technical Appendix. These costs are discussed in detail in Table 8.9 of the Cost Technical Appendix.

5.0 GENERAL WASTE DIVERSION CONSIDERATIONS

This section describes several factors that must be considered in waste diversion. The factors include:

- quantities and composition of waste generated;
- markets for secondary materials;
- waste export;
- source reduction; and
- future trends in waste generation and composition.

5.1 Waste Generation Quantities and Composition

Estimates of residential waste quantities and composition were developed separately and both methodologies are described in the Service Technical Appendix. A brief description of the process used to estimate residential generation and composition is included in this section and Sections 5.1.1 to 5.1.5. The approach used to develop IC&I generation and composition estimates is presented in Section 5.1.6. The composition of disposed waste for each Region is estimated by determining the composition of generated waste and then subtracting the composition of waste diverted to estimate the composition of disposed waste. This procedure is carried out separately for residential and IC&I wastes. More detailed data are presented in the Service Technical Appendix and are summarized by Region in this section.

Several residential waste composition studies have ben carried out in Southern Ontario municipalities in the past five years. These include studies in East York (Gore and Storrie Ltd., 1991), Ottawa-Carleton (R.W. Beck and Associates, 1992), Quinte (Quinte Regional Recycling 1992), Kingston (Gore and Storrie Ltd., 1992) and Guelph (City of Guelph, 1991).

The results of each study were analyzed to identify the most appropriate data to use to estimate residential waste composition in the GTA 3Rs analysis. Results from the various studies were reasonably consistent, with some exceptions (which are detailed in the (Service Technical Appendix).

The East York residential waste composition study was chosen as being the most representative for the GTA because East York is located within the GTA, and the study was carried out relatively recently (1989). The East York information was modified as required, to include additional waste categories not measured during the composition

study, and was used for residential waste composition estimates presented in the following sections. Waste composition data from this study agree favourably with data from the other studies for all major waste categories.

An effort was made to allocate total residential waste generation tonnages to single-family and multi-family households because the options and recovery rates for the two types of household are different. The allocation of total residential waste to single-family and multi-family residents was carried out by assuming that single-family residents generate 17% per capita more than multi-family residents (as explained in the Service Technical Appendix).

The number of single-family and multi-family households in each Region was used to allocate total residential waste generation to these two groups. The residential waste composition estimates vary somewhat from one Region to another, as determined by the percentage of multi-family households in the Region.

5.1.1 Durham Residential

Historical data on residential waste generation and management in Durham Region is presented in Table 5.1. Residential waste generation in Durham Region is estimated to have averaged 330 kg/capita/year, for 1986 to 1992.

Projections for residential waste generation in Durham Region, from 1993 to the year 2015 are presented in Table 5.2. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Durham Region in 1992 is estimated to have had the following composition:

- 17% newspaper;
- 18.4% other paper;
- 5% glass;
- 3.7% tinplate steel;
- 1% aluminum;
- 5.7% plastic;
- 22.6% food;
- 14% yard waste;

Table 5.1

Residential Waste Generation and Management in Durham
1986 - 1992

					RESIDENTIAL DIVERSION (Tonnes)						WASTE LANDFILLED			
Year	**Population**	**Residential Generation (Tonnes)**	**Residential Generation Rate (T/Cap/Yr)**	**Residential Diversion Rate %**	**Total Residential Diversion**	**Green Waste**	**Backyard Compost**	**Blue Box**	**Igloo & Container**	**Other**	**Residential (Durham #s) (Tonnes)**	**ICI (by differ.) (Tonnes)**	**Total (Metro #s) (Tonnes)**	*As reported by Durham (Tonnes)*
1986	326,179	*101,115*	*0.31*	0.00	0						101,115	152,125	253,240	
1987	340,570	104,634	0.31	4.35	4,550					4,550	100,084	161,826	261,910	*215,479*
1988	347,837	112,036	0.32	10.68	11,970			11,970			100,066	190,509	290,575	*207,957*
1989	385,480	126,049	0.33	15.82	19,939	2,274		16,087		1,578	106,110	189,353	295,463	*225,070*
1990	397,540	132,587	0.33	18.77	24,890	2,100	525	20,459	1,788	18	107,697	190,264	297,962	*240,364*
1991	409,070	137,994	0.34	23.02	31,769	2,214	3,301	20,841	810	4,604	106,225	118,694	224,919	*183,922*
1992	421,014	140,078	0.33	26.40	36,987	8,045	3,794	17,166	2,077	5,905	103,091	62,615	165,706	*121,573*
		Average =	*0.33 (excl. 1986)*											

Notes:
1) Population data: Social Environment Technical Appendix, 1994.
2) For the 1992 "other" category, diversion figures provided for January - June 1992 were doubled. This includes 613.5 tonnes of recyclables from transfer stations.
3) OMMRI numbers used for Blue Box diversion estimates for 1990 and 1991.
4) The 1987 residential generation rate was applied to the 1986 population to calculate residential waste generated for 1986.

Assumptions:
- Landfill numbers for Durham, as reported by Metro, are assumed to be correct.
- the discrepancy between Region of Durham landfill numbers and Metro landfill numbers is due to loads delivered by haulers not on Durham's approved list.
- the residential quantities reported by Durham are assumed to be correct. The difference between Durham and Metro numbers is assumed to be IC&I waste.
- the Blue Box Program began in 1988.
- backyard composters divert 169 tonnes/composter/year

Table 5.2
Waste Generation Estimate
Region of Durham
1993 to 2015

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)	Total Generation (Tonnes) (6)
1993	433,307	142,991	172,277	196,396	339,387	337,979
1994	445,959	147,166	178,765	203,792	350,959	347,848
1995	458,980	151,463	185,497	211,467	362,930	358,004
1996	472,382	155,886	192,482	219,429	375,316	368,458
1997	486,175	160,438	199,730	227,692	388,130	379,217
1998	500,370	165,122	207,252	236,267	401,389	390,289
1999	514,980	169,943	215,056	245,164	415,107	401,684
2000	530,017	174,906	223,155	254,397	429,302	413,413
2001	545,493	180,013	231,558	263,976	443,989	425,485
2002	561,420	185,269	240,278	273,917	459,186	437,908
2003	577,813	190,678	249,326	284,232	474,910	450,694
2004	594,684	196,246	258,716	294,936	491,182	463,854
2005	612,048	201,976	268,458	306,042	508,018	477,397
2006	629,919	207,873	278,568	317,568	525,441	491,337
2007	648,312	213,943	289,058	329,526	543,469	505,683
2008	667,241	220,190	299,943	341,935	562,125	520,448
2009	686,724	226,619	311,238	354,811	581,430	535,645
2010	706,775	233,236	322,959	368,173	601,409	551,285
2011	727,412	240,046	335,120	382,037	622,083	567,381
2012	748,651	247,055	347,740	396,424	643,478	583,948
2013	770,511	254,269	360,835	411,352	665,621	600,999
2014	793,009	261,693	374,424	426,843	688,536	618,547
2015	816,163	269,334	388,523	442,916	712,250	636,607

Notes:
(1) Population data from Durham Regonal Official Plan (Report 93-P-128), Social Environment Technical Appendix, 1994.
(2) Population projection multiplied by 0.33 tonnes/capita/year (based on historical data)
(3) Employment data: Social Environment Technical Appendix, 1994
(4) Number of employees (col. 3) multiplied by 1.14 tonnes/employee/year (based on 1987 data)
(5) Column 2 plus Column 4
(6) Population (Col. 1) multiplied by 0.78 tonnes/cap/yr (1987 Total Gen. Rate divided by population)

- 2.7% disposable diapers; and
- 9.8% other materials.

Based on the available data, the disposed residential waste stream had the following composition in 1992.

- 11% newspapers;
- 23% other papers;
- 3% glass;
- 3% metal;
- 8% plastic;
- 38% food and yard waste; and
- 14% other materials.

These disposed residential waste composition data are presented in Figure 5.1.

5.1.2 Metro Toronto Residential

Historical data on residential waste generation and management in Metro Toronto is presented in Table 5.3. Residential waste generation (which includes some commercial waste and waste from municipal facilities (i.e. parks) which cannot be separated out of the reported totals) in Metro Toronto is estimated to have averaged 480 kg/cap/year, for 1986 to 1992.

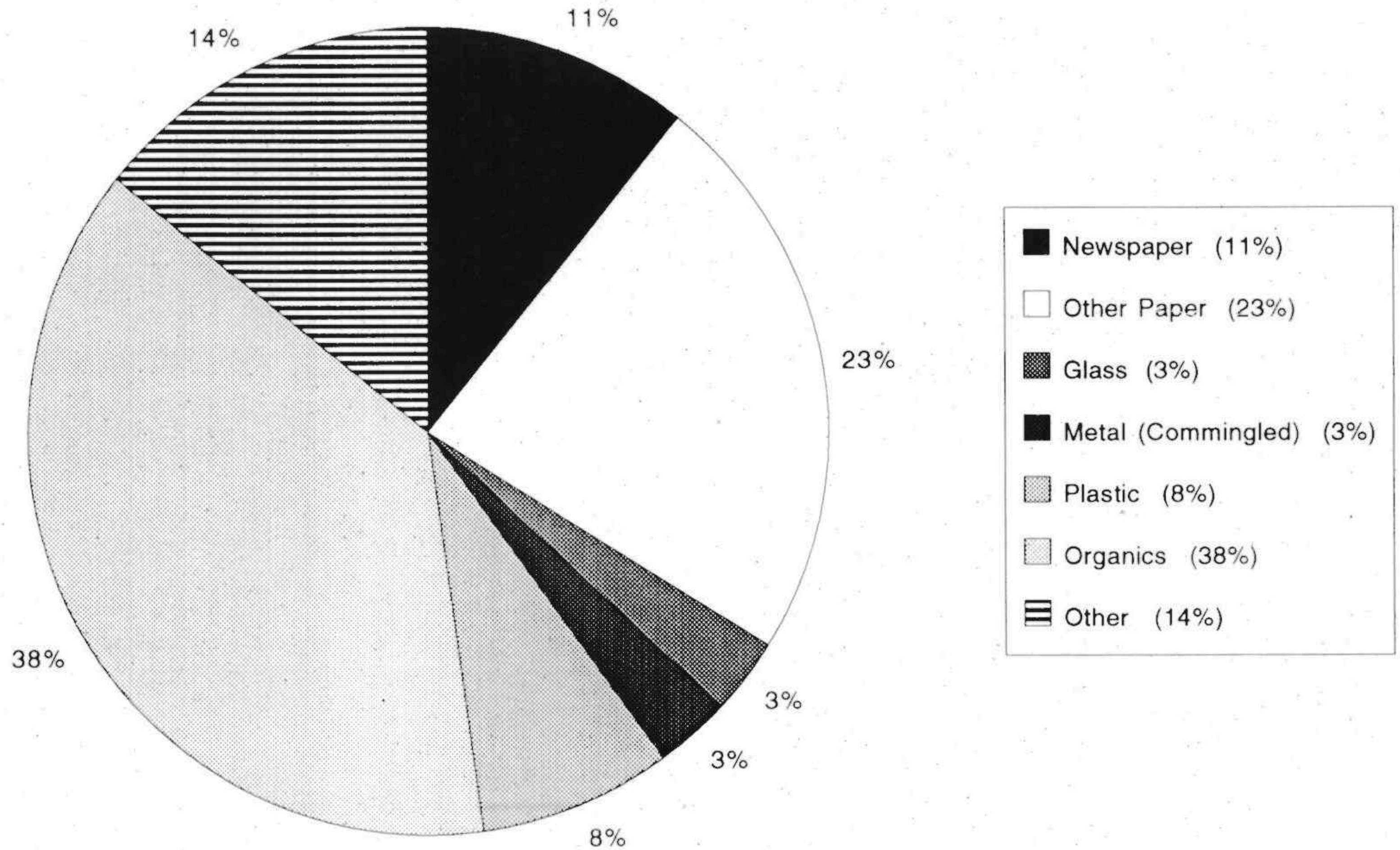
Projections for residential waste generation in Metro Toronto, from 1993 to the year 2015 are presented in Table 5.4. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Metro Toronto in 1992 was estimated to have had the following approximate composition (see Service Technical Appendix for details):

- 17.9% newspaper;
- 19.5% other paper;
- 5.3% glass;
- 3.8% tinplate steel;
- 1% aluminum;
- 6% plastic;

Figure 5.1

Composition of Disposed Residential Waste
Region of Durham



Note: Values shown on figure may not agree with text and Table due to rounding.

Table 5.3

Residential Waste Generation and Management in Metropolitan Toronto
1986 - 1992

		Residential	Residential	Residential	RESIDENTIAL DIVERSION (Tonnes)						WASTE LANDFILLED		
Year	Population	Generation (Tonnes)	Generation Rate (T/Cap/Yr)	Diversion Rate %	Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Residential (Tonnes)	ICI (Tonnes)	Total (Tonnes)
1986	2,175,900	1,007,243	0.46	0.00	0						1,007,243	1,445,857	2,453,100
1987	2,125,520	1,021,576	0.48	2.11	21,554	4,639		16,915			1,000,022	1,490,098	2,490,120
1988	2,133,559	1,028,254	0.48	3.85	39,592	13,537		26,055			988,662	1,405,066	2,393,728
1989	2,130,855	1,060,206	0.50	8.00	84,821	22,241		62,580			975,385	1,241,573	2,216,958
1990	2,137,204	1,053,120	0.49	10.42	109,688	27,082	7,028	75,065		513	943,432	1,169,697	2,113,129
1991	2,275,771	1,010,488	0.44	15.99	161,565	56,445	11,731	85,054		8,335	848,923	704,492	1,553,415
1992	2,289,798	1,069,790	0.47	18.81	201,177	71,062	17,745	99,671	2,611	10,088	868,613	200,015	1,068,628
		Average =	*0.48*										

Notes:

1) Population data: Social Environment Technical Appendix, 1994.
2) Green waste includes leaves, yard waste & Xmas trees
3) Residential waste is "Municipal waste" which includes residential, light commercial collected by municipal forces, street sweepings, catch basin cleanings, Parks Dept. wastes
4) 1991 landfill total revised to include Symes transfer station, contaminated soil and sewage sludge quantities
5) Information supplemented with Metropolitan Toronto Works Department Capital Works Program, 1994-1998, approved January 26, 1994.

Table 5.4

Waste Generation Estimate
Metropolitan Toronto
1993 to 2015

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)	Total Generation (Tonnes) (6)
1993	2,303,912	1,105,878	1,389,440	1,528,384	2,634,262	2,718,616
1994	2,318,113	1,112,694	1,399,264	1,539,190	2,651,885	2,735,373
1995	2,332,401	1,119,552	1,409,157	1,550,073	2,669,625	2,752,233
1996	2,346,778	1,126,453	1,419,119	1,561,031	2,687,484	2,769,198
1997	2,361,243	1,133,397	1,429,153	1,572,068	2,705,465	2,786,267
1998	2,375,797	1,140,383	1,439,257	1,583,183	2,723,565	2,803,440
1999	2,390,441	1,147,412	1,449,432	1,594,375	2,741,787	2,820,720
2000	2,405,175	1,154,484	1,459,680	1,605,648	2,760,132	2,838,107
2001	2,420,000	1,161,600	1,470,000	1,617,000	2,778,600	2,855,600
2002	2,431,741	1,167,236	1,482,510	1,630,761	2,797,997	2,869,454
2003	2,443,538	1,172,898	1,495,126	1,644,639	2,817,537	2,883,375
2004	2,455,393	1,178,589	1,507,850	1,658,635	2,837,224	2,897,364
2005	2,467,305	1,184,306	1,520,682	1,672,750	2,857,057	2,911,420
2006	2,479,274	1,190,052	1,533,623	1,686,985	2,877,037	2,925,543
2007	2,491,302	1,195,825	1,546,674	1,701,341	2,897,166	2,939,736
2008	2,503,389	1,201,627	1,559,837	1,715,821	2,917,447	2,953,999
2009	2,515,534	1,207,456	1,573,111	1,730,422	2,937,878	2,968,330
2010	2,527,737	1,213,314	1,586,498	1,745,148	2,958,462	2,982,730
2011	2,540,000	1,219,200	1,600,000	1,760,000	2,979,200	2,997,200
2012	2,555,564	1,226,671	1,609,729	1,770,702	2,997,373	3,015,566
2013	2,571,223	1,234,187	1,619,518	1,781,470	3,015,657	3,034,043
2014	2,586,978	1,241,749	1,629,366	1,792,303	3,034,052	3,052,634
2015	2,602,830	1,249,358	1,639,274	1,803,201	3,052,560	3,071,339

Notes:
(1) Population data prepared by Hemson Consulting Ltd., Social Environment Technical Appendix, 1994.
(2) Population projection multiplied by 0.48 tonnes/capita/year (based on historical data)
(3) Employment data: Social Environment Technical Appendix, 1994.
(4) Number of employees (col. 3) multiplied by 1.1 tonnes/employee/year (based on 1987 data)
(5) Column 2 plus Column 4
(6) Population (Col. 1) multiplied by 1.18 tonnes/cap/yr (1987 Total Gen. Rate divided by population)

- 24% food;
- 9.1% yard waste;
- 2.9% disposable diapers; and
- 10.4% other materials.

Based on the available data, the disposed residential waste stream had the following composition in 1992:

- 15% newspapers;
- 23% other papers;
- 4% glass;
- 4% metal;
- 7% plastic;
- 31% food and yard waste; and
- 16% other materials.

Waste composition data are presented in Figure 5.2.

5.1.3 York Region Residential

Historical data on residential waste generation and management in the York Region is presented in Table 5.5. Residential waste generation in York Region is estimated to have averaged 370 kg/capita/year, for 1986 to 1992.

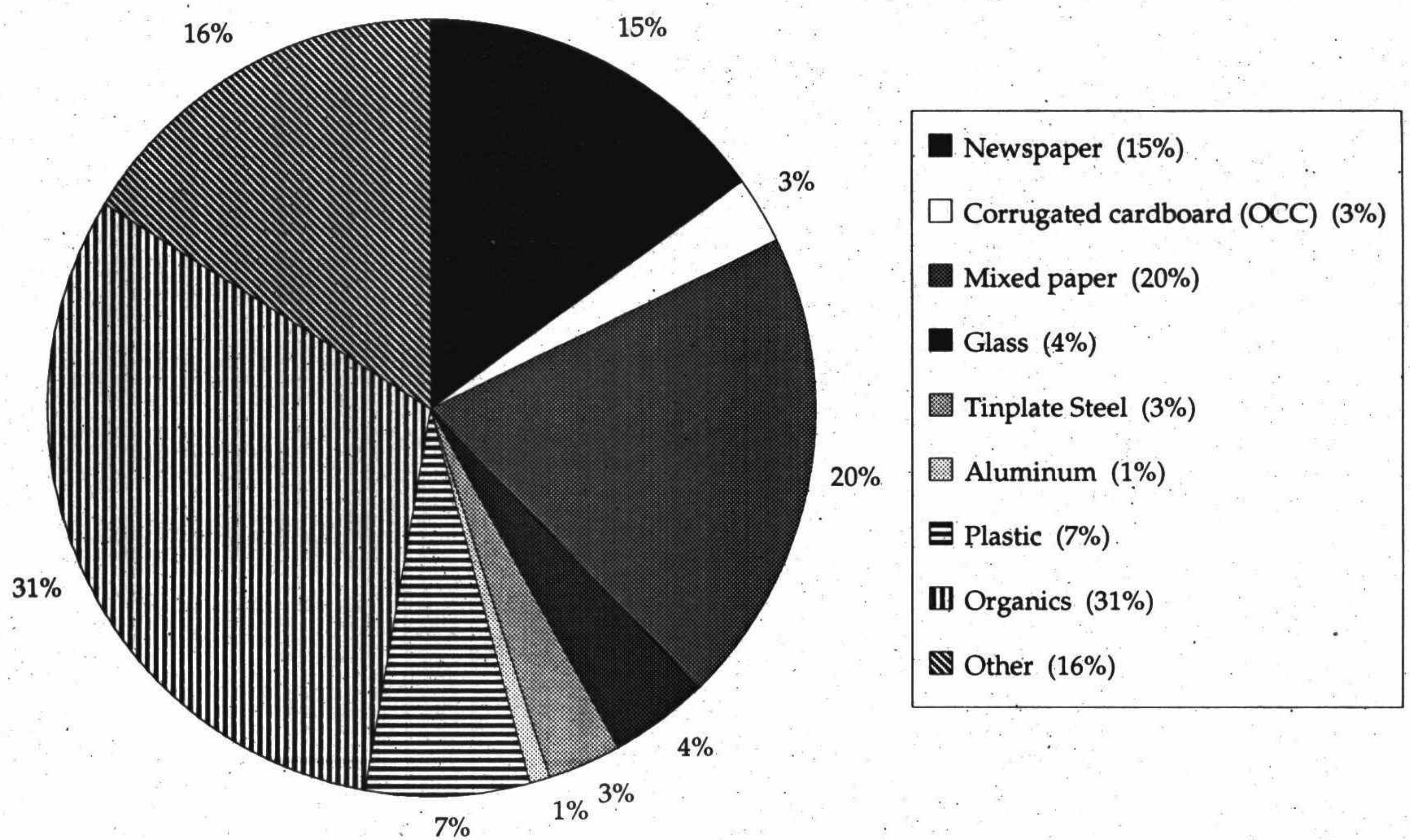
Projections for residential waste generation in York Region, from 1993 to the year 2015 are presented in Table 5.6. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in York Region is estimated to have had the following composition:

- 17% newspaper;
- 18% other papers;
- 5% glass;
- 3.7% tinplate steel;
- 1% aluminum;
- 5.7% plastic;
- 22.5% food;
- 14.7% yard waste;

Figure 5.2

Composition of Disposed Residential Waste
Metropolitan Toronto



Note: Values shown on figure may not agree with text and Table due to rounding.

Table 5.5

Residential Waste Generation and Management in Region of York
1986 - 1992

Year	Region of York Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes)							WASTE LANDFILLED		
					Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Total ICI	Residential (Tonnes)	ICI (Tonnes)	Total (Tonnes)
1986	350,602	103,350	0.29									103,350	221,650	325,000
1987	386,103	158,295	0.41									158,295	339,487	497,782
1988	409,292	157,013	0.38	3.18	5,000			5,000				152,013	336,712	488,725
1989	442,022	140,711	0.32	5.22	7,352	752		6,600				133,359	377,296	510,655
1990	466,791	179,558	0.38	17.91	32,158	8,100		24,058				147,400	303,689	451,089
1991	504,981	174,532	0.35	21.11	36,839	9,400		27,439				137,693	161,643	299,336
1992	524,296	196,250	0.37	27.57	54,101	16,300	4,909	25,433		7,458		142,150	26,434	168,583
		Average =	*0.37* (excl. 1986)											

Notes:

1) Population and employment data: Social Environment Technical Appendix, 1994.
2) 25000 tonnes added to total waste landfilled for the Township of King and Georgina Landfills for 1986-1991; 15000 tonnes added for 1992. (Flewelling, Region of York 1993)
3) 1990 - 1991 Blue Box quantities supplied by OMMRI (Boland, OMMRI, 1993)
4) 1992 Blue Box quantities: supplied by Markham, Richmond Hill, and Region of York
5) 1988 and 1989 Blue Box quantities for Markham only
6) 1988 Residential landfill quantity from Table 2-1, (MacLaren Engineers 1989)
7) 1988 Residential landfill percentage applied to 1986 and 1987 to calculate quantity going to landfill (31.8%)

Table 5.6

Waste Generation Estimate
Region of York
1993 to 2015

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	IC&I Waste (Tonnes) (4)	Total Generation (Tonnes) (5)	Total Generation (Tonnes) (6)
1993	544,349	201,409	269,509	428,519	629,928	604,227
1994	565,170	209,113	279,827	444,925	654,038	627,339
1995	586,786	217,111	290,540	461,959	679,069	651,332
1996	609,230	225,415	301,664	479,646	705,061	676,245
1997	632,532	234,037	313,213	498,009	732,046	702,111
1998	656,725	242,988	325,205	517,076	760,064	728,965
1999	681,844	252,282	337,656	536,873	789,155	756,847
2000	707,923	261,932	350,583	557,427	819,358	785,795
2001	735,000	271,950	364,005	578,768	850,718	815,850
2002	752,824	278,545	377,941	600,926	879,471	835,635
2003	771,080	285,300	392,411	623,933	909,233	855,899
2004	789,778	292,218	407,435	647,822	940,040	876,654
2005	808,931	299,304	423,034	672,624	971,929	897,913
2006	828,547	306,562	439,230	698,376	1,004,938	919,687
2007	848,639	313,996	456,046	725,113	1,039,110	941,989
2008	869,219	321,611	473,506	752,875	1,074,486	964,833
2009	890,297	329,410	491,634	781,698	1,111,108	988,230
2010	911,887	337,398	510,457	811,627	1,149,025	1,012,195
2011	934,000	345,580	530,000	842,700	1,188,280	1,036,740
2012	949,405	351,280	538,811	856,709	1,207,989	1,053,840
2013	965,064	357,074	547,768	870,951	1,228,025	1,071,221
2014	980,981	362,963	556,874	885,430	1,248,393	1,088,889
2015	997,161	368,950	566,132	900,150	1,269,099	1,106,849

Notes:
(1) Population data: Social Environment Technical appendix, 1994.
(2) Population projection multiplied by 0.37 tonnes/capita/yr (average rate based on historical data)
(3) Employment data: Social Environment Technical Appendix, 1994.
(4) Number of employees (col. 3) multiplied by 1.59 tonnes/employee/year ('86 & '87 average rate)
(5) Column 2 plus Column 4
(6) Population (Column 1) multiplied by 1.11 tonnes/cap/year
('86 & '87 Avg. Total Gen. Rate divided by population)

- 2.7% disposal diapers;
- 9.7% other materials.

As 6,025 tonnes (11.1%) of the total residential waste stream recycled in 1992 is described as "other" material, diversion rates by material were the best possible estimates. Based on the available data, the disposed residential waste stream had the following composition in 1992:

- 11% newspapers;
- 25% other papers;
- 3% glass;
- 4% metal;
- 7% plastic;
- 37% food and yard waste; and
- 13% other materials.

These waste composition data are presented in Figure 5.3.

5.1.4 Peel Residential

Historical data on residential waste generation and management in Peel Region is presented in Table 5.7. Residential waste generation in Peel Region is estimated to have averaged 410 kg/capita/year, for 1986 to 1992.

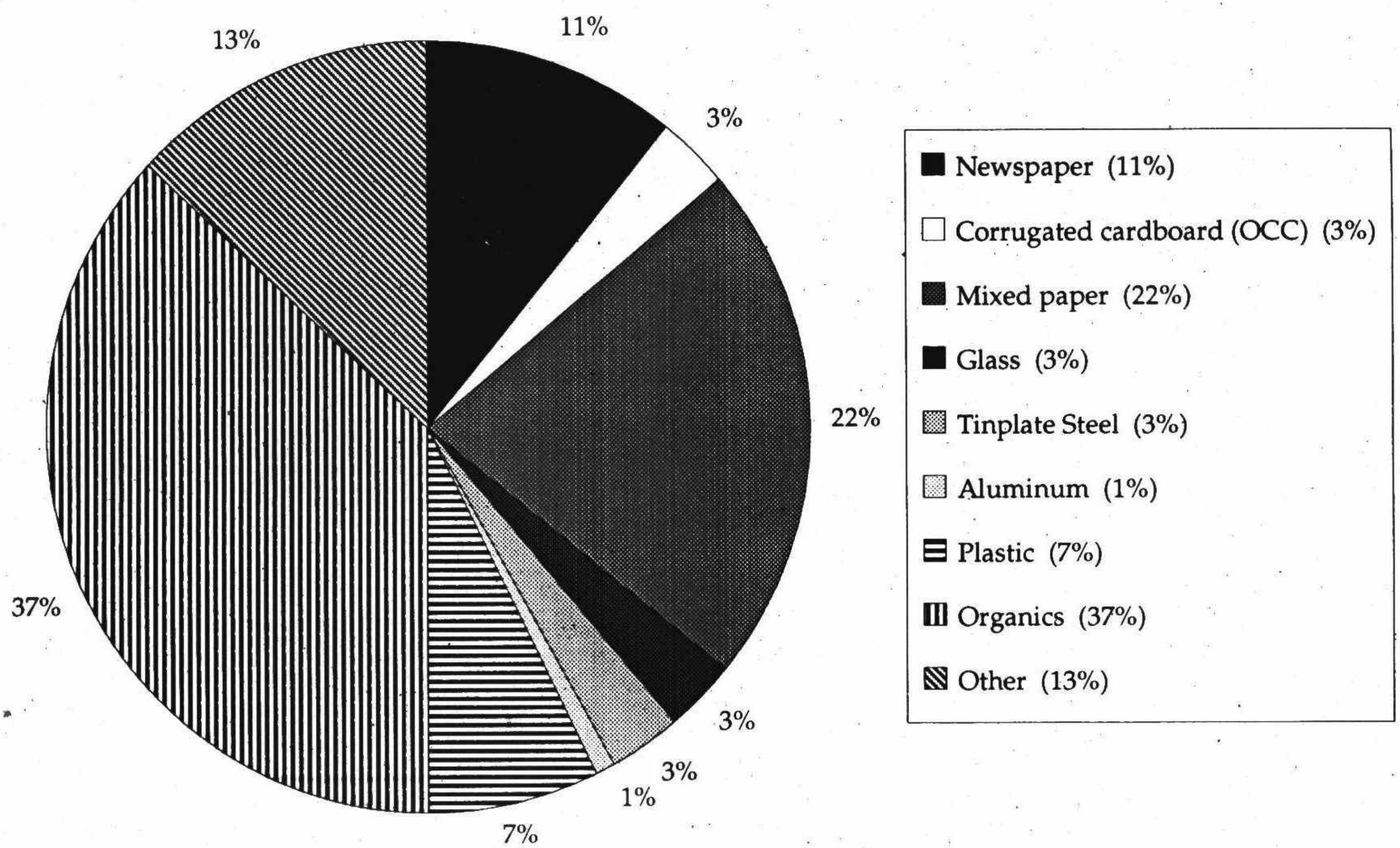
Projections for residential waste generation in Peel Region, from 1993 to the year 2015 are presented in Table 5.8. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Region of Peel was estimated to have had the following composition:

- 17.2% newspaper;
- 18.8% other paper;
- 5.1% glass;
- 3.8% tinplate steel;
- 1% aluminum;
- 6% plastic;
- 23.1% food;
- 12.4% yard waste;

Figure 5.3

Composition of Disposed Residential Waste
Region of York



Note: Values shown on figure may not agree with text and Table due to rounding.

Table 5.7

Residential Waste Generation and Management in Region of Peel 1986 - 1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes) Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	WASTE LANDFILLED Residential (Tonnes)	ICI (Tonnes)	Total (Tonnes)
1986	592,170	*242,790*	*0.40*										**716,385**
1987	636,475	252,391	0.40								252,391	449,360	701,751
1988	667,445	264,103	0.40								264,103	478,926	743,030
1989	702,450	307,922	0.44	9.86	**30,351**		1,800		200		277,571	470,449	748,021
1990	724,530	311,320	0.43	12.40	38,599	3,639	3,730	30,497	250	483	272,721	361,513	634,234
1991	732,798	289,589	0.40	15.11	43,761	4,611	6,741	30,469	540	1,400	245,828	224,086	469,914
1992	755,178	313,296	0.41	19.14	59,967	7,661	9,606	34,867	5,793	2,040	253,329	44,203	297,532
		Average =	*0.41*										

Notes:

1) Population data: Social Environment Technical Appendix, 1994.
2) 1991 and 1992 Green Waste totals include compost from Mississauga wet/dry project.
3) 1989 Total Residential Diversion (tonnes) from SENES Consultants, 1991
4) Disposal and diversion data supplied by Region of Peel (Morgan-Fraser, L., Region of Peel, 1993)

Table 5.8

Waste Generation Estimate
Region of Peel
1993 to 2015

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)	Total Generation (Tonnes) (6)
1993	778,242	319,079	400,956	565,348	884,427	856,066
1994	802,010	328,824	411,863	580,727	909,551	882,211
1995	826,504	338,867	423,067	596,524	935,391	909,154
1996	851,745	349,215	434,576	612,752	961,968	936,920
1997	877,758	359,881	446,398	629,421	989,302	965,534
1998	904,565	370,872	458,542	646,544	1,017,416	995,022
1999	932,191	382,198	471,016	664,133	1,046,331	1,025,410
2000	960,661	393,871	483,829	682,199	1,076,070	1,056,727
2001	990,000	405,900	496,991	700,757	1,106,657	1,089,000
2002	1,004,943	412,027	510,510	719,819	1,131,846	1,105,437
2003	1,020,112	418,246	524,398	739,401	1,157,647	1,122,123
2004	1,035,510	424,559	538,664	759,516	1,184,075	1,139,061
2005	1,051,140	430,967	553,317	780,177	1,211,144	1,156,254
2006	1,067,005	437,472	568,369	801,400	1,238,872	1,173,706
2007	1,083,111	444,076	583,831	823,202	1,267,277	1,191,422
2008	1,099,459	450,778	599,713	845,595	1,296,374	1,209,405
2009	1,116,055	457,583	616,028	868,599	1,326,182	1,227,661
2010	1,132,900	464,489	632,786	892,228	1,356,717	1,246,190
2011	1,150,000	471,500	650,000	916,500	1,388,000	1,265,000
2012	1,160,554	475,827	657,136	926,562	1,402,389	1,276,609
2013	1,171,204	480,194	664,352	936,736	1,416,930	1,288,324
2014	1,181,952	484,600	671,646	947,021	1,431,621	1,300,147
2015	1,192,798	489,047	679,021	957,420	1,446,467	1,312,078

Notes:

(1) Population data: Social Environment Technical Appendix,1994.
(2) Population projection multiplied by 0.41 tonnes/capita/year (based on historical data)
(3) Employment data: Social Environment Technical Appendix,1994.
(4) Number of employees (col. 3) multiplied by 1.41 tonnes/employee/year (based on 1987 data)
(5) Column 2 plus Column 4
(6) Population (Col.1) multiplied by 1.1 tonnes/cap/year (1987 Total Gen. Rate divided by population)

- 2.7% disposable diapers;
- 10% other materials.

Based on the available data, the disposed residential waste stream in 1992 had the following composition:

- 13% newspapers;
- 22% other papers;
- 4% glass;
- 4% metal;
- 7% plastic;
- 37% food and yard waste; and
- 13% other materials.

These waste composition data are presented in Figure 5.4.

5.1.5 Halton Region Residential

Historical data on residential waste generation and management in the Halton Region is presented in Table 5.9. Residential waste generation in Halton Region is estimated to have averaged 400 kg/cap/year, for 1986 to 1992.

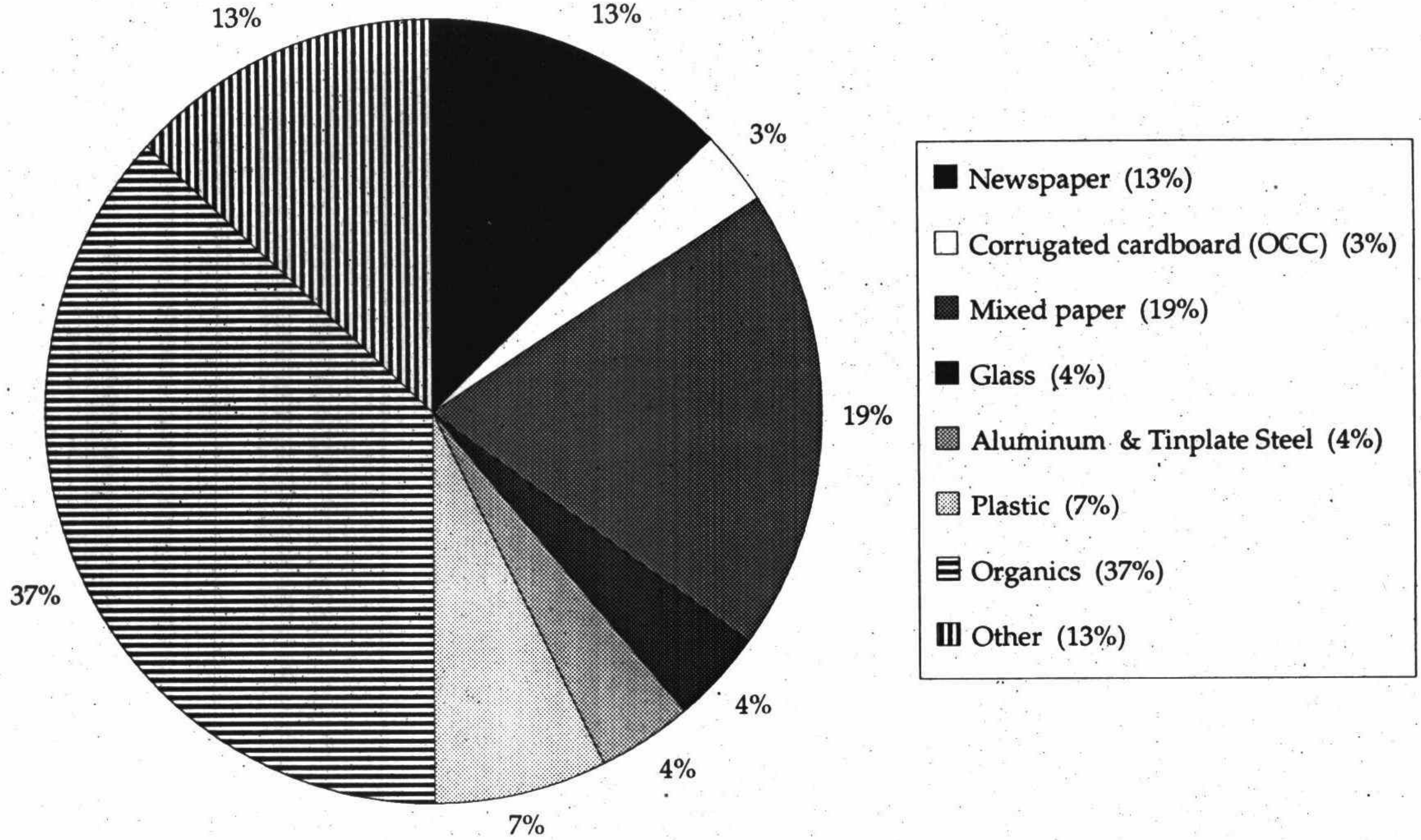
Projections for residential waste generation in Region of Halton, from 1993 to the year 2015 are presented in Table 5.10. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Halton Region was estimated to have had the following composition:

- 17% newspaper;
- 19% other paper;
- 5% glass;
- 3.7% tinplate steel;
- 1% aluminum;
- 5.8% plastic;
- 23% food;
- 13% yard waste;

Figure 5.4

Composition of Disposed Residential Waste
Region of Peel



Note: Values shown on figure may not agree with text and Table due to rounding.

Table 5.9

Residential Waste Generation and Management in Region of Halton 1986 - 1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes)						WASTE LANDFILLED		
					Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Residential (Tonnes)	ICI (Tonnes)	Total (Tonnes)
1986	271,389												
1987	275,945										101,600	109,100	272,900
1988	284,994										103,400	111,100	294,100
1989	291,600					1,812					96,700	93,300	190,000
1990	297,650	115,151	0.39	20.97	24,151	3,747		20,404			91,000	101,000	192,000
1991	313,136	123,014	0.39	30.33	37,314	8,140		25,934	3,240		85,700	70,000	155,700
1992	322,467	135,193	0.42	34.32	46,393	15,000	4,343	23,450	3,600		88,800	13,800	102,600
		Average =	*0.40*										

Notes:

1) Population data: Social Environment Technical Appendix,1994.
2) Data for 1990-1992 supplied by Region of Halton Staff
3) Data for 1987-1989 supplied by MOEE staff

Table 5.10

Waste Generation Estimates
Region of Halton
1993 to 2015

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)	Total Generation (Tonnes) (6)
1993	332,075	132,830	150,576	134,013	266,843	242,415
1994	341,970	136,788	156,160	138,982	275,770	249,638
1995	352,160	140,864	161,951	144,136	285,000	257,077
1996	362,653	145,061	167,956	149,481	294,542	264,737
1997	373,459	149,384	174,185	155,025	304,408	272,625
1998	384,587	153,835	180,644	160,773	314,608	280,749
1999	396,046	158,418	187,343	166,735	325,154	289,114
2000	407,847	163,139	194,290	172,918	336,057	297,728
2001	420,000	168,000	201,495	179,331	347,331	306,600
2002	429,885	171,954	208,967	185,981	357,935	313,816
2003	440,002	176,001	216,716	192,877	368,878	321,201
2004	450,357	180,143	224,752	200,029	380,172	328,761
2005	460,957	184,383	233,087	207,447	391,830	336,499
2006	471,805	188,722	241,730	215,140	403,862	344,418
2007	482,909	193,164	250,694	223,118	416,281	352,524
2008	494,274	197,710	259,991	231,392	429,102	360,820
2009	505,907	202,363	269,632	239,972	442,335	369,312
2010	517,814	207,126	279,631	248,872	455,997	378,004
2011	530,000	212,000	290,000	258,100	470,100	386,900
2012	540,929	216,372	295,506	263,000	479,372	394,878
2013	552,082	220,833	301,115	267,992	488,825	403,020
2014	563,466	225,386	306,831	273,080	498,466	411,330
2015	575,084	230,034	312,656	278,264	508,297	419,811

Notes:
(1) Population data: Social Environment Technical Appendix, 1994.
(2) Population projection multiplied by 0.40 tonnes/capita/year (based on historical data)
(3) Employment data: Social Environment Technical Appendix, 1994.
(4) Number of employees (col. 3) multiplied by 0.89 tonnes/employee/year (based on 1987 data)
(5) Column 2 plus Column 4
(6) Population (Col. 1) multiplied by 0.73 tonnes/cap/yr (1990 Total Gen. Rate divided by population)

- 2.7% disposable diapers; and
- 9.9% other materials.

Based on the available data, the disposed residential waste stream had the following composition in 1992:

- 8% newspapers;
- 26% other papers;
- 2% glass;
- 12% metal and plastic;
- 33% food and yard waste; and
- 19% other materials.

Waste composition data are presented in Figure 5.5.

5.1.6 IC&I Waste Quantities and Composition

IC&I waste quantities and composition were first estimated for each GTA Region (including Halton) and were added together to estimate IC&I quantities for the GTA.

Historical IC&I Waste Generation

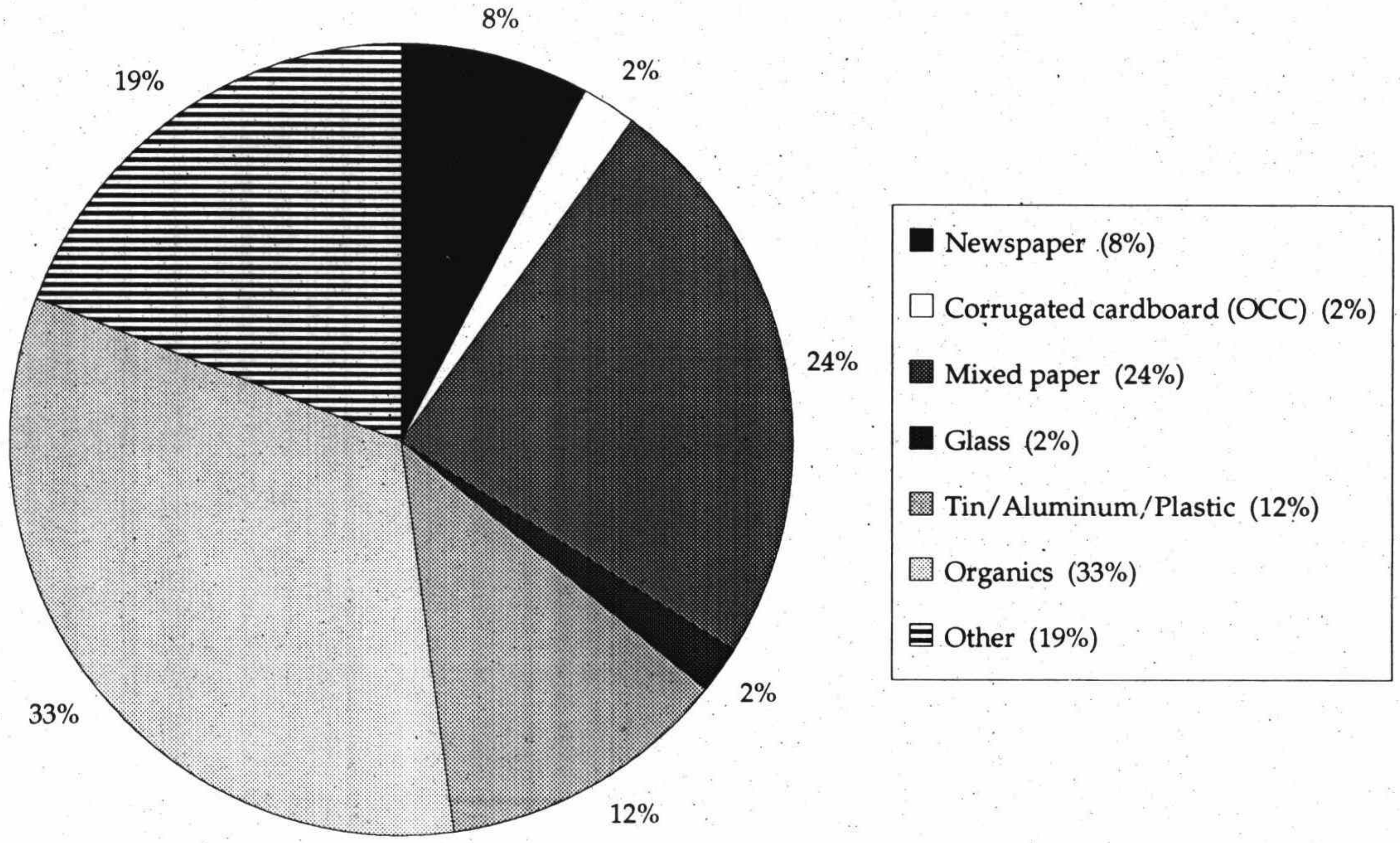
Table 5.11 summarizes available data on IC&I waste disposed at GTA landfills between 1986 and 1992. IC&I waste export began in mid-1991, therefore, reported IC&I waste disposed in GTA from 1990 may not reflect the total quantity of IC&I waste which was disposed.

IC&I Projections

IC&I waste projections for the GTA were developed by examining IC&I waste disposal patterns in each GTA Region for the period from 1986 to 1992. Historical rates (expressed as tonnes/employee/year) were applied to future employment projections for each GTA Region to estimate future IC&I waste generation by Region. These estimates were added together to estimate IC&I waste projections for the GTA for the period 1993 to 2015. Table 5.12 presents IC&I waste projections for GTA Regions from 1993 to 2015.

Figure 5.5

Composition of Disposed Residential Waste
Region of Halton



Note: Values shown on Figure may not agree with text and Table due to rounding.

Table 5.11
Summary of Available Data on IC&I Waste Disposal by Region in GTA Landfills 1986-1992

Year	Durham IC&I Waste Disposal (tonnes)	Halton IC&I Waste Disposal (tonnes)	Peel IC&I Waste Disposal (tonnes)	Metro IC&I Waste Disposal (tonnes)	York IC&I Waste Disposal (tonnes)	Total GTA IC&I Waste Disposal (tonnes)
1986	152,125			1,445,857	221,650	1,819,632
1987	161,826	109,100	449,360	1,490,098	339,487	2,549,872
1988	190,509	111,100	478,926	1,405,066	336,712	2,522,313
1989	189,353	93,300	470,449	1,241,573	377,296	2,371,971
1990	190,264	101,000	361,513	1,169,697	303,689	2,126,163
1991	118,694	70,000	224,086	704,492	161,643	1,278,915
1992	62,615	13,800	44,203	200,015	26,434	347,066

Notes:

1) IC&I waste quantities to landfill were calculated by difference between total waste to landfill and residential waste to landfill
2) 1986 Durham value equals total waste landfilled (from SWEAP 4.1 report,1988) less residential waste to landfill(estimated from 1987 generation rate)
3) 1987 Durham value equals total waste landfilled (from MacLaren Waste Study,1988) less residential waste to landfill
4) Total waste to landfill for Durham taken from Metro landfill records for 1988-1992; tonnages for Brock & Scott landfills added to total waste landfilled.
5) Residential waste to landfill taken from Region of Durham landfill records.
6) Metro landfill data taken from Metro Toronto landfill records
7) 1991 Metro IC&I quantity excludes waste export. Metro estimates that 400,000 tonnes were exported, which is assumed to be primarily IC&I
8) 1992 Metro IC&I quantity excludes waste export. Metro estimates that 1,000,000 tonnes were exported, which is assumed to be primarily IC&I
9) 1991 Peel IC&I quantity excludes waste export. Peel estimates that 53,125 tonnes were exported, which is assumed to be primarily IC&I
10) 1992 Peel IC&I quantity excludes waste export. Peel estimates that 253,183 tonnes were exported, which is assumed to be primarily IC&I
11) 1988 residential landfill quantity for Region of York from Table 2-1, Waste Management Study, 1989, MacLaren
12) 1988 residential landfill percentage for Region of York applied to 1986 and 1987 to calculate quantity going to landfill (31.8%)
13) 25,000 tonnes added to total waste landfilled for the Township of King and Georgina Landfills for 1986-1991; 15,000 tonnes added for 1992. (personal communication with Mr. J. Flewelling - Region of York)
14) Halton landfill data (1990 - 1992) supplied by Region of Halton; Data provided by MOEE in July 1993 indicate that IC&I waste landfilled in 1987, 1988 and 1989 totalled 109,100, 111,100 and 93,300 tonnes respectively.

Table 5.12

IC&I Waste Generation* Projections for GTA Regions, 1993 to 2015

Year	Durham Region IC&I Waste Generation (tonnes)	Halton Region IC&I Waste Generation (tonnes)	Metro Toronto IC&I Waste Generation (tonnes)	Peel Region IC&I Waste Generation (tonnes)	York Region IC&I Waste Generation (tonnes)	Total GTA IC&I Waste Generation (tonnes)
1993	196,396	134,013	1,528,384	565,348	425,824	2,849,965
1994	203,792	138,982	1,539,190	580,727	442,127	2,904,818
1995	211,467	144,136	1,550,073	596,524	459,053	2,961,253
1996	219,429	149,481	1,561,031	612,752	476,629	3,019,323
1997	227,692	155,025	1,572,068	629,421	494,877	3,079,083
1998	236,267	160,773	1,583,183	646,544	513,824	3,140,591
1999	245,164	166,735	1,594,375	664,133	533,496	3,203,903
2000	254,397	172,918	1,605,648	682,199	553,921	3,269,083
2001	263,976	179,331	1,617,000	700,757	575,128	3,336,192
2002	273,917	185,981	1,630,761	719,819	597,147	3,407,624
2003	284,232	192,877	1,644,639	739,401	620,009	3,481,158
2004	294,936	200,029	1,658,635	759,516	643,747	3,556,864
2005	306,042	207,447	1,672,750	780,177	668,394	3,634,810
2006	317,568	215,140	1,686,985	801,400	693,983	3,715,076
2007	329,526	223,118	1,701,341	823,202	720,553	3,797,740
2008	341,935	231,392	1,715,821	845,595	748,139	3,882,883
2009	354,811	239,972	1,730,422	868,599	776,782	3,970,587
2010	368,173	248,872	1,745,148	892,228	806,522	4,060,943
2011	382,037	258,100	1,760,000	916,500	837,400	4,154,037
2012	396,424	263,000	1,770,702	926,562	851,321	4,208,009
2013	411,352	267,992	1,781,470	936,736	865,473	4,263,024
2014	426,843	273,080	1,792,303	947,021	879,861	4,319,107
2015	442,916	278,264	1,803,201	957,420	894,489	4,376,290

*IC&I waste generation estimates are based on the rate of IC&I waste disposal in 1987. IC&I wastes which had traditionally been diverted from disposal prior to 1987 are not of interest to this study, and are not included in IC&I waste generation estimates

Where possible, IC&I waste projections were based on IC&I waste disposal rates recorded for 1987, as this is the year from which provincial waste diversion objectives (which are stated as a reduction in the waste disposal rate per capita recorded for 1987) will be measured in the future. IC&I waste which had historically been recycled prior to that time, and had not been disposed in municipal landfills, is not included in these estimates. Therefore, for the remainder of this study, the term "IC&I waste generation" refers to the rate of IC&I waste disposal in 1987. Where 1987 data were unusually high, an appropriate or typical generation rate was chosen, based on the available data.

IC&I Waste Composition

The composition of IC&I waste was estimated using a two step waste allocation process described in detail in the Service Technical Appendix. An in-house waste allocation and composition model (which was developed using the result of a number of IC&I waste generation and composition studies) was used to carry out this estimate.

Table 5.13 presents estimates of IC&I waste generation and composition for major sectors, in the GTA in 1992, excluding the construction and demolition sector. The quantity of construction and demolition (C&D) waste generated in GTA was estimated using historical data. The composition of C&D waste generated in GTA was estimated using results of waste composition studies carried out by Proctor and Redfern and Senes.

The IC&I waste stream generated (including C&D waste) in 1992 is estimated to have the following composition: paper (mixed plus newspaper, 23.5%), OCC (11.8%), metals (6.7% ferrous, 4% non-ferrous), plastics (8.3%), glass (2.9%), wood (6.3%), food and yard (8.7%), total C&D (construction and demolition) (21.3%) and all "other" (6.5%). The methodology used to develop this estimate is described in the Service Technical Appendix.

5.2 Markets for Secondary Materials

5.2.1 General

Developing strong, flexible and sustainable markets for secondary materials is the key to sustaining successful waste diversion programs that incorporate reuse and recycling. The alternative waste diversion systems discussed in the GTA 3Rs analysis share an underlying assumption that each system is developed in conjunction with a strong market development program.

Table 5.13

Estimated IC&I Waste Generation and Composition
By Major IC&I Sectors (Excluding Construction/Demolition Sector) in GTA, 1992

Major SIC	Description		Waste Composition (tonnes)													
			OCC	ONP	Mixed P	Glass	Ferrous	Non-Ferr	HDPE	PET	Plastic	Food	Yard	Wood	Other	Total
1	Primary	%	18.11%	0.00%	9.51%	0.00%	14.22%	7.60%	0.00%	0.00%	2.36%	0.00%	0.00%	30.25%	17.96%	100.00%
		tonnes	2,560	0	1,344	0	2,010	1,074	0	0	333	0	0	4,276	2,539	14,136
2	Manufacturing	%	13.95%	2.93%	20.60%	1.92%	11.56%	5.89%	0.25%	0.05%	9.09%	4.61%	0.64%	15.85%	12.64%	100.00%
		tonnes	99,747	20,936	147,276	13,714	82,640	42,084	1,780	378	65,001	32,970	4,600	113,328	90,331	714,786
4	TCU	%	13.44%	5.29%	27.78%	3.05%	13.75%	10.11%	1.11%	0.35%	11.49%	2.52%	0.28%	3.67%	7.16%	100.00%
		tonnes	20,576	8,097	42,527	4,670	21,055	15,486	1,699	531	17,593	3,866	424	5,618	10,969	153,110
5	Wholesale	%	27.00%	1.00%	11.50%	0.80%	3.67%	2.17%	0.00%	0.00%	16.70%	5.00%	0.80%	22.00%	9.37%	100.00%
		tonnes	47,976	1,777	20,434	1,422	6,515	3,851	0	0	29,674	8,884	1,422	39,091	16,643	177,688
6	Retail	%	24.46%	11.35%	28.49%	3.68%	2.70%	0.35%	5.86%	0.10%	4.94%	11.94%	0.74%	1.41%	3.99%	100.00%
		tonnes	79,459	36,864	92,535	11,956	8,764	1,137	19,052	320	16,046	38,775	2,414	4,569	12,960	324,851
7	FIRE	%	9.38%	2.04%	51.42%	3.39%	2.64%	2.23%	1.31%	0.64%	7.94%	7.70%	0.65%	1.79%	8.88%	100.00%
		tonnes	4,525	982	24,806	1,633	1,276	1,076	630	310	3,828	3,716	312	863	4,284	48,241
8	Non-Commercial	%	6.61%	4.81%	30.00%	1.77%	11.19%	11.52%	0.20%	0.10%	10.13%	10.00%	6.69%	1.01%	5.96%	100.00%
		tonnes	18,565	13,516	84,283	4,978	31,435	32,358	570	285	28,458	28,094	18,796	2,848	16,757	280,943
9	Commercial	%	11.91%	3.31%	28.87%	9.23%	6.72%	3.98%	2.80%	0.72%	5.94%	21.14%	0.73%	1.39%	3.25%	100.00%
		tonnes	53,435	14,865	129,524	41,424	30,161	17,856	12,570	3,231	26,653	94,873	3,265	6,244	14,582	448,683
10	Public Administration	%	10.00%	0.00%	38.00%	5.00%	3.00%	1.56%	0.00%	0.00%	7.00%	2.00%	0.00%	0.00%	33.44%	100.00%
		tonnes	3,877	0	14,734	1,939	1,163	607	0	0	2,714	775	0	0	12,964	38,774
	All Sectors	tonnes	330,721	97,036	557,463	81,735	185,018	115,529	36,301	5,053	190,302	211,954	31,233	176,838	182,030	2,201,212
		%	15.02%	4.41%	25.33%	3.71%	8.41%	5.25%	1.65%	0.23%	8.65%	9.63%	1.42%	8.03%	8.27%	100.00%

With some materials, technological barriers to material utilization are yet to be overcome, and this is perceived as an obstacle to market development. For example, with plastics recycling, material identification and contamination has long been an impediment to more effective recycling. Like many technical issues, this one is presently under study and various groups and organizations are dedicating resources to its solution, with increasing success.

Market development policies can enhance diversion of secondary materials by promoting, facilitating or mandating their use. The following is a list of ten major policy initiatives that can support secondary material market development. Any one, or combination of the following initiatives could be implemented to help increase demand for recyclables:

- minimum content requirements;
- minimum utilization requirements;
- tradable recycling credits;
- product stewardship;
- government procurement;
- tax credits and exemptions;
- grants and loans
- market development zones;
- cooperative marketing;
- virgin materials taxes;
- removal of subsidies on virgin materials;
- local market development incentives.

Along with the status of current and future markets for secondary materials, these policy approaches are discussed in Schedule H of the Service Technical Appendix.

5.2.2 Markets for Fibres

ONP (Old Newsprint)

The market for ONP is expected to remain stable in the foreseeable future. Four new de-inking mills which were constructed in Ontario in 1992 have increased Ontario's de-inking capacity to 468,000 tonnes per year. Ontario Blue Box programs currently collect an estimated 240,000 tonnes per year. Prices paid for ONP are currently approximately $15-32/tonne (WRO, 1994). Ontario is currently a net importer of ONP.

OCC (Old Corrugated Cardboard)

OCC is one of the easiest materials to recycle, as it is generated in large quantities by many large IC&I generators. OCC has an established market in Ontario which is capable of absorbing more domestic OCC than is currently collected. In addition, planned expansions by Domtar in Cornwall, Ontario, and Windsor, Quebec may increase the demand for OCC by an estimated 360,000 tonnes per year. The price paid for OCC depends on the price of substitute fibres such as ONP. As markets for these materials firm up, the price for OCC should stabilize at $25 to $35/tonne.

Boxboard

Markets for post-consumer boxboard have traditionally been weak, due in part to high levels of contamination by glues, plastics and liners. Limitations on the use of post-consumer boxboard for food packaging also limits the potential markets for this material. Work is continuing to address the problem associated with glues. Trials are being undertaken to satisfy concerns of Health and Welfare Canada (WRO, 1994).

Two of the three Ontario mills (Cascades Paperboard International in Toronto and Strathcona in Napanee) currently accept clean, baled post-consumer boxboard. The Current prices paid for post-consumer boxboard are $20/tonne. A number of developments may stimulate the market for post-consumer boxboard in the future (see Service Technical Appendix). If these proposals do not proceed, currently available markets could not absorb the supply if expanded dry programs were to be implemented in GTA.

OMG (Old Magazines)

OMG is an important feedstock in the de-inking process, and is required in the manufacture of recycled newsprint. It offers strong fibres and clay content, which add stiffness, opacity and bulk to the newsprint. De-inking mills reportedly run at a 30% OMG, 70% ONP ratio, although one US mill can manufacture newsprint from a feedstock which is 100% OMG. Demand for OMG by Ontario mills increased from 37,000 tonnes in 1991 to 247,700 tonnes in 1992, and is expected to increase to 348,700 tonnes in 1993. Demand therefore considerably exceeds available supply. Prices currently paid for OMG are $25/tonne. It is not common for mills to accept OMG commingled with ONP at the price paid for ONP ($32/tonne).

Fine Paper

Fine paper is now collected through many office recycling programs. The demand for recycled content in fine papers has resulted in the development of a number of de-inking facilities to accept post-consumer fine paper as feedstock. Prices for fine paper depend on the grade, and average $100 to $120/tonne. In 1992, prices for CPO (computer print-out) averaged $190 to $220/tonne, with the price of white and coloured ledger at $120 to $140/tonne. The demand for post-consumer fine paper is expected to remain stable for the foreseeable future.

Mixed Paper

Mixed paper has traditionally been used by mills in processes which have a higher tolerance for contamination and can accept a heterogeneous feedstock. The use of mixed paper depends on price, availability, and the prices of other fibres such as ONP and OCC. As prices rise, mills which produce containerboard, boxboard, and roofing products can effectively substitute mixed paper for ONP and OCC. Mixed paper is traditionally used by mills which manufacture napkins, toilet paper, tissue paper, and is also used in the manufacture of boxboard (up to 40% mixed paper feedstock). Prices for mixed paper vary from $0 to $30/tonne, and can be expected to remain low as long as inexpensive OCC and ONP are available. Demand for mixed paper is expected to continue to exist for the foreseeable future.

Polycoat Packaging

Polycoat packaging is used in milk containers and drink boxes. Most mills with a hydrapulper can accept polycoat. After hydrapulping the quality of the pulp is similar to computer printouts, only the fibres are longer and stronger. Prices paid for polycoat vary from $90 U.S. to $150 U.S./tonne (exclusive of shipping costs). For the foreseeable future, markets for polycoat would be located in the Northeastern U.S., as no Ontario mill has a hydrapulper. The market demand is expected to be strong for the foreseeable future.

5.2.3 Markets for Plastics

The markets for separated PET and HDPE are strong and current prices are $165/tonne and $50 to $130/tonne respectively. Demand for polystyrene currently exceeds supply. The price for polystyrene shipped to the CPRA recycling facility in the GTA is approximately $88/tonne.

Plastic food and dairy tubs have only recently been separately marketed to reprocessors from a few municipal recycling program. Industry is currently working to establish quality standards, market opportunities and prices. Demand should begin to grow for this material (WRO, 1994). The Plastic Manufacturer's Association of Canada recently announced a market demand for 1.3 million pounds of film plastic. In order to meet this demand, the PFMAC has guaranteed a market for plastic film collected in the communities of Quinte, Peterborough, Hamilton-Wentworth and Mississauga. Additional municipal programs will be encouraged to add film as the market demand increases (WRO, 1994).

5.2.4 Markets for Organics

In comparison to traditional recyclables, markets and processing methods for organics are just emerging. Organic materials can be grouped into a number of headings, including: usable food fit for human consumption; other putrescibles; non-putrescibles and compost. For ease of presentation, organics are grouped into three categories for this discussion. The groupings are food waste, yard waste and compost.

Human consumption of excess food is the preferred option over using it as animal feed. Agencies such as Second Harvest and food banks can broker food waste that is of suitable quality and redistribute it to social service agencies for distribution to the needy. This is a suitable option for some cooked food waste from the IC&I sector. Several IC&I establishments have made arrangements for diversion of food. If the food is fed to swine, strict cooking requirements must be followed. There is only a small number of registered swine farmers in Ontario that are licensed to accept food waste for swine feed. For cattle requirements are less strict. For example, direct feeding is possible provided that the waste contains no animal products (i.e. dairy, etc.).

Rendering of food waste is a viable but relatively expensive option. Rendering companies traditionally have focused on processing meat products to produce oils and tallow needed for a number of industrial processes. With the decline of red meat consumption, some rendering companies have excess capacity which they can use to process food wastes into animal food supplements. Landspreading is also an option for some food processing wastes. Where the above options can not be used, food waste can be composted, either on or off-site, and the finished compost can be used for a variety of purposes.

Biofuel production (methanol, methane, etc.) derived from organics (particularly custom-grown crops) is a future potential end use for organics. However, it is not considered an end use for food and yard waste from the GTA at this time. Composting is

an option for processing of both food and yard wastes. Options for use of finished compost depend on its quality. Ontario has stringent compost quality guidelines and these will limit the potential end uses of finished compost in many cases. End uses for high quality compost include sale at garden maintenance centres, land reclamation, landscaping (for parks and golf courses, etc). Lower quality compost can be used for rehabilitation of land not intended for residential development, and as landfill cover material. For several reasons, quantification of the potential end uses of finished compost generated in the GTA was not possible.

5.2.5 Markets for Construction and Demolition Waste

Several processing facilities, in or near the GTA, accept mixed or source separated loads of C&D waste for processing and diversion to beneficial end uses. Based on available data, capacity appears to be available to process C&D wastes generated in GTA. In addition, private sector companies have expressed an interest in building additional capacity if the economics become more favourable. The economics of operating these facilities depend on the comparative cost of waste disposal. Because of the low cost of waste disposal south of the border in the last year or two, operators of these facilities report that much C&D waste which could be processed and diverted is landfilled due to the lower cost. End uses of processed C&D material include:

- drywall
  - manufacture of new drywall
  - soil amendment
  - kitty litter;
- bricks and blocks
  - roadbase/backfill
  - decorative facades;
- untreated wood
  - chipped for fuel, landscaping
  - compost bulking
  - animal bedding
  - particle board
  - manufactured building products;
- plastic
  - chipped/shredded and used as insulation;
- asphalt shingles
  - paving materials (technical barriers at present);

- old asphalt - road surface and granular base;
- metals and OCC - traditional markets.

Processing capacity exists in the GTA for 1,000,000 tonnes per year of old asphalt as confirmed by WRO staff with the Ontario Hot Mix Producers Association. The preferred use of this material is in Reclaimed Asphalt Pavement (RAP). Municipalities have raised some concerns about the durability of this material, and 60% of old asphalt is being stockpiled at present. The other 40% is used in recycled hot mix or as granular base material (WRO, 1994).

5.2.6 Markets for Metals

Metal recycling is a well established practice, through a network of metal brokers. It has been assumed for this study that markets will continue to be available for metals recovered from the GTA waste stream, based on discussions with metal brokers. Prices paid will sometimes depend on the spot market price for the metal. The price for aluminum varies considerably as commodity prices change. The current price is around $900/tonne (WRO, 1994). The price for steel is generally in the $75-$95/tonne range. The metal processing requirements will depend on the end markets chosen. As an example, some steel mills have a very low tolerance for tin in the mix, and will therefore not accept white goods.

5.2.7 Markets for Glass

Consumers glass is the main end market for glass containers (cullet) collected in municipal Blue Box programs in Ontario. There is currently enough market capacity to absorb all container glass collected in the Province, provided it has been colour-separated. All municipalities, with the exception of a few, are colour-separating their glass.

Consumers have purchased 99.3% of the glass shipped to them by municipalities since 1991. In 1992, they purchased around 90,000 tonnes of container glass from Ontario Blue Box programs, compared with 31,000 tonnes in 1989. Consumers' recycling rate is currently about 30% and they have targeted a 50% recycling rate for the year 2000. Prices for colour-sorted flint and green glass are $47/tonne and $42/tonne respectively.

There are alternate end uses for unmarketable mixed coloured glass and residual broken glass such as aggregate substitute and sand substitute for sandblasting (WRO, 1994).

5.2.8 Markets for Textiles

Used textiles can be used as clothing, industrial fibre and industrial wiping cloths. Used clothing commands the highest price and industrial fibre currently is worth the least. There is currently a significant undersupply of textiles, particularly to satisfy the growing demand for used clothing. The infrastructure for textile collection is currently in its infancy, however, markets for the material are relatively well-established and stable. Social service and charitable organizations are increasingly involved in providing diversion opportunities, and future linkages with government organizations and agencies are likely. Such alliances would provide a cost-effective mechanism for recovering textiles. Prices are currently in the $180/tonne range.

5.3 Waste Export

5.3.1 Role of Waste Export in this Study

Waste export is considered waste sent to disposal, and is not considered waste diverted from disposal (through 3Rs or other means) in this study. The export of waste from Ontario for disposal in other jurisdictions has therefore not been addressed in this study. The quantities of waste generated in GTA and diverted from disposal through 3Rs have been estimated and addressed in this study without taking available information on waste export into account for a number of reasons presented in earlier sections of this document. Waste that is exported includes materials which could be diverted through reuse, recycling and composting, thus reducing the potential for beneficial use of these materials. This study does not have sufficient information on the composition of wastes exported to determine their diversion potential.

5.3.2 Overview of Waste Export Issue

Quantities of solid waste exported to the United States have increased significantly since mid-1991, due primarily to three factors. Tipping fees at landfill sites within the GTA increased dramatically between 1988 and 1991, and landfill bans were imposed on specific materials. In addition, changes to U.S. Department of Agriculture regulations in July 1991 no longer required incineration of solid non-hazardous domestic waste originating in Canada, thus making landfill disposal of Ontario garbage in the U.S. possible.

Thirdly, new criteria for landfill design and operation were promulgated in the U.S. Resource Conservation and Recovery Act (RCRA) Subtitle D by the U.S. Environmental Protection Agency in 1991. These criteria are being met or exceeded by many of the privately-owned landfills in the northeastern U.S., but those that do not meet the criteria are attempting to use all of their remaining capacity quickly.

Some landfill owners lowered their tipping fees in order to attract as much business as possible before the RCRA Subtitle D deadline lowered their prices to a level where it became cost competitive to ship waste from the GTA to the U.S., particularly when the tipping fees reached $150/tonne. Industry experts had predicted that these landfills would cease operation soon after the October 1993 deadline, thus likely resulting in a price increase at other landfills in the area which comply with the regulatory requirements. However, the industry is of the opinion that the requirements of Subtitle D under RCRA will be met more slowly than originally anticipated, therefore lower prices south of the border will continue to provide an economical method of waste disposal for generators in the GTA.

Gartner Lee Limited and Ernst and Young prepared a preliminary study on waste export in Ontario for the Waste Reduction Office in February 1993. The most common destinations for the exported waste were Pennsylvania, Ohio, Indiana, New York and Michigan. Based on U.S. facility contact data and on truck counts carried out at selected border posts for a one week period, it was estimated that approximately 1.3 million tonnes of waste were exported from Ontario in 1992. Alternative sources of information also were used to verify the study estimate. Officials from a select number of Ontario municipalities were contacted, and their total waste export estimate was 1.397 million tonnes. U.S. State Officials and Disposal Facility Operators estimated that they had received approximately 1.03 million tonnes of waste from Ontario sources. Both estimates tend to confirm the order of magnitude of the study findings. The study concluded that no accurate record of export activity for 1992 was available.

5.4 Source Reduction

5.4.1 Residential Source Reduction

Residential source reduction includes measures that reduce the materials that have potential to become solid waste, before they ever enter the solid waste stream. The measures may include some or all of the following:

- reduction in product volume and packaging;

- increasing product life and durability;
- promoting product redesign to encourage repair;
- purchasing products selectively to reduce product/packaging consumption;
- promoting reuse of products through refillable packages, reuse centres, garage and rummage sales;
- alternative landscape such as xeriscaping and grass mulching;
- reducing the volume of junk mail;
- promoting repair/tailoring of appliances, clothing, footwear; and
- reduction of household wastes.

A more detailed discussion of source reduction is presented in Schedule B of the Service Technical Appendix.

Source reduction of residential waste will occur as a result of at least two major factors including:

- changes in consumer behaviour; and
- policies and technologies which will reduce residential waste generation.

The problem encountered in quantifying source reduction results from limitations of the existing waste measurement system. It is difficult to distinguish source reduction results from other variables, such as illegal dumping in the case of Direct Cost Systems, garbaration of organic matter, increased reuse activities, etc. In spite of this limitation, source reduction attributed to two major factors (NAPP and increased education) are included in the analysis.

The National Packaging Protocol (NAPP) has targeted a 50% overall reduction in the packaging waste stream by the year 2000, relative to a 1988 baseline. Source reduction is the preferred option among the 3Rs. It is an objective that 50% of waste diversion shall be achieved through new source reduction and new reuse initiatives with recycling making up the remainder (National Taskforce on Packaging, 1993). Assuming that packaging constitutes 30% of the residential waste stream, this would lead to a 7.5% overall reduction by the year 2000. For the purpose of this study, a conservative estimate of 7.5% waste diversion through source reduction by the year 2015 has been adopted. A uniform source reduction rate of 0.33% per year has been assumed to achieve this value.

A further reduction, attributable to increased public education about waste reduction and reuse, has been assumed for this study. It is assumed that by 2015, an additional 0.5% reduction would be gained by extending the life of durable goods, reusing and repairing

items, buying food in smaller quantities using leftovers, etc. A uniform rate of 0.02% per year has been assumed to achieve this value.

Therefore from a baseline year of 1992, to the year 2015 (23 years), source reduction is assumed to reduce the weight of residential waste disposed by a total of 8%. The effect is an estimated 3% source reduction estimate by the year 2000.

5.4.2 IC&I Source Reduction

Source reduction of IC&I waste in the future is attributed to at least three major factors that differentiate this component from residential source reduction. They are:

- changes in the employment profile of each GTA Region;
- innovation by IC&I generators;
- innovation by the C&D sector.

The methods used to estimate source reduction as a result of these three factors are described below.

Source Reduction Due to Changes in the Employment Profile of Each GTA Region

Future employment in each major IC&I sector in each Region was compared to current employment to determine if there was a major shift towards IC&I groups which have traditionally been lower waste generators. This was carried out by assuming that regional IC&I waste generation would continue at the rates experienced around 1987. Changes in generation as a result of employment shifts to different industries in each GTA Region are presented in Schedule O of the Service Technical Appendix.

Source Reduction Due to Innovation

The IC&I sector (excluding the construction and demolition sector which is addressed separately) is expected to reduce the generation of some wastes over the planning period through modernization, process change, increased operational efficiencies, etc. While it is generally accepted that this trend is occurring and will continue, because of global competition, etc., very little quantitative data are available on the impacts of this trend on future IC&I waste generation for the whole IC&I sector. Many case studies quote exceptional programs where significant reductions have been achieved (described in Schedule O of the Service Technical Appendix). However, these are high profile

examples of innovative behaviour and cannot be applied to the total IC&I sector for waste generation estimates. A modest source reduction allowance of 0.5% per year in waste reduction, staring in 1993, and continuing to the year 2015 (when the reduction increment would be 11.5%) was used for this analysis.

Source Reduction in the Construction and Demolition Sector

Construction and demolition waste was separated from other IC&I waste for this study, as its method of generation is different to other IC&I wastes. The construction and demolition industry will also innovate, and continue to develop more efficient construction methods. An allowance of 0.25% per year, beginning in 1993, and increasing by increments of 0.25% per year from 1993 to 2015 was applied to estimate source reduction in construction and demolition waste would reach 5.75% by the year 2015.

The estimated quantities of IC&I waste that will be reduced at source as a result of these three factors are presented in Schedule O of the Service Technical Appendix. These quantities were subtracted from the total estimated IC&I waste to be generated in each GTA Region to estimate net waste generation by the IC&I sector in each Region from 1996 to 2015.

These assumptions resulted in an estimated 5% source reduction of IC&I waste by the year 2000, and a 17.2% source reduction of IC&I waste by the year 2015, measured against a 1992 baseline.

5.5 Future Waste Generation and Composition

This section presents a summary of information about potential future changes to waste generation and composition in both the residential and IC&I sectors. No definitive research has yet been conducted to investigate the effect of future lifestyle, economic, and technological trends on product design, use and disposal. Research and articles written to date reflect a wide range of opinions on the topic. This section, therefore, presents a description of the current state of debate related to potential effects of future trends on the waste stream.

5.5.1 Short-Term Trends: 1995 to 2000

5.5.1.1 Residential Sector

A 1992 report projected that municipal solid waste generation will increase at a rate of 1.3% annually between 1990 and 2000, compared with the annual increase of 2.8% experienced between 1980 and 1990 (Franklin Associates, 1992).

Other trends identified in various studies that may affect residential waste generation include:

- advertising spending, which is considered a barometer of consumerism, has increased from $200 per person in 1950 to $468 per person in 1990, with new markets, such as the Asian market being investigated (Naisbitt & Aburdene, 1990);

- paper and paperboard will be the dominant materials in the municipal waste stream and will make up an estimated 38% of total waste generated due to increased volume of literature (magazines, periodicals) consumed worldwide, linked with a trend to globalization (Franklin Associates, 1992, Naisbitt & Aburdene, 1990);

- the use of paper and paperboard, plastics, wood and some miscellaneous materials is expected to increase faster than the population, while the use of glass and metals are projected to increase more slowly than the population. Food wastes are projected to show no increase in generation, while yard trimmings are expected to decline as a percentage of the waste stream (Franklin Associates, 1992);

  In Canada, this increase in packaging and containers should be mitigated by changes expected to result from compliance with the National Packaging Protocol (NAPP) which requires a 50% reduction in packaging going to landfill by the year 2000. This and other product stewardship initiatives may cause reductions in the quantities of packaging waste produced and disposed;

- an increase in the consumption of durable goods is predicted to occur over the next decade (Franklin, 1992) which could cause a gradual reduction in waste generation rates over time. Short-term consumption pattern trends do not suggest a rapid movement towards durable goods. For example, steel

production (a metal used in durable goods) remains on the decline (Worldwatch Institute, 1994) while the generation of containers and packaging is on the incline (Franklin Associates, 1992);

- an increase in opportunities for bulk-shopping may have a small effect on the waste stream. For example, chains such as the Price Club and Aikenheads warehouse-style outlets promote bulk shopping by offering consumers large price discounts for no frill, buy-in-bulk shopping. There is often less packaging associated with this shopping behaviour although neither its impact on the waste stream nor the continuation of the trend has been studied.

5.5.1.2 IC&I Sector

Recent voluntary and mandatory initiatives aimed at Canadian industries will impact on the generation and composition of the IC&I waste stream by encouraging the IC&I sector to evaluate and modify waste generating habits to achieve a reduced waste stream. Some of these include:

- Canadian Industry Product Stewardship Initiative (CIPSI);
- Canadian Buy Recycled Alliance (CBRA); and
- Ontario's 3Rs Regulations (waste/packaging audit and waste/packaging reduction plan legislation).

Product stewardship initiatives under consideration in Ontario may also reduce the amount of packaging waste generated and disposed. Packaging stewardship programs may also result in a shift to different packaging types.

The trend to material substitution in products and packaging is seen in several areas. Technological developments permit resource substitution, however, the impact of these shifts on waste generation is not yet quantified. Some of the shifts include:

- the use of corn, seaweed, straw, hemp, sugar cane, and sugar beet cellulose as a substitute for trees in the manufacturing of paper (Isaacs, 1994);

- the production of car bumpers and other components from textile fibres (Beck, 1993); and

- shoes made from diaper waste, plastic milk jugs, and rubber tires (Globe and Mail, 1994).

In contrast to changes that promise to reduce waste generation, the IC&I sector currently appears to be increasing its use of papers. The Worldwatch Institute attributes the rising global demand for office and printing paper to the steady growth of service industries and office employment and attributes the decline in demand for steel to increased use of other substitutes (1994).

5.5.2 Long-Term Trends: 2000 to 2016

This section explores some long-term trends that have potential to impact future generation rates and the composition of the waste stream if they occur as predicted.

5.5.2.1 Residential Sector

Lifestyle trends and consumerism have potential to affect waste generation and composition in the residential sector, over the long-term. Potential effects are described below.

Lifestyle Trends

A number of forces are predicted to impact lifestyle trends. These forces include the information age, commonly referred to as the "information highway", and the new global economy.

Because of a proliferation of information technology (associated with the "information age"), computers are no longer associated with office environments only and are increasingly found in GTA households. If predictions of the further development of the "information highway" prove correct, more householders will rely on computers and other telecommunication technology to purchase goods, pay bills, provide services and advice, and conduct business, all without leaving the home. Over time, homeowners may need to purchase more "gadgets" such as cellular phones, fax machines, portable computers, etc. to keep in touch.

Proponents of the information era predict that technology will eliminate the need for paper and other materials. In a recent article, the Toronto Star reported that within a decade, newspapers could be replaced by light, portable, electronic tablets. News and other information would be delivered anywhere in the world by fibre optic cable or satellite signal to computer memory cards contained within the table (Toronto Star, 1994). In the short-term however, the recent surge in information-based technologies has increased use of paper rather than causing a reduction. Revolutions in printing technologies,

photocopiers and fax machines have facilitated the growth in paper consumption (Worldwatch Institute, 1994).

The trend to home shopping promises a further impact on waste generation and composition and some futurists contend that the trend is continuing to grow (Popcorn, 1991; Aburdene & Naisbitt, 1992). The exact impact of this trend is subject to debate, with some arguing that frequent communications between consumer and manufacturer will eliminate the need for excessive packaging (Popcorn, 1991). Others suggest that mail/catalogue shopping will continue to be popular (Aburdene & Naisbitt, 1992) and may increase the need for transportation packaging, thus contradicting the trend towards bulk packaging.

A further opinion suggests that development of other home shopping trends (e.g. home delivery to household holding tanks for milk, soda, mineral water and bins for laundry soap and dog kibble, delivered like home heating oil) may contribute to waste reduction (Popcorn, 1991).

Consumerism

The increase of available consumer products in the global economy is expected to continue to increase our demand for, and access to goods and services, to the extent that the typical GTA resident probably has access to more than a million consumer products (Snider, 1992).

Products from every culture are now available in stores across North America and the predicted short-term impact of the global economy on consumerism is even greater availability of products. Products from developing countries (that are often cheaper and of lower quality) will initially flood the markets, until these countries begin to pay greater attention to social and environmental standards and demand a universally acceptable standard of living.

Consumers will also show a preference for convenience in food choices, and will continue to demand pre-packaged food. Currently, 86% of Americans who eat dinners at home during the week eat pre-packaged or take-out foods (Popcorn, 1992) and it is predicted that take-out food spending will rise at three times the rate of total food spending. However, some analysts have identified a contradictory trend to "deconsumption", "voluntary simplicity", and the emergence of the "vigilante consumer" (3SC Monitor, 1992; During, 1993; Popcorn, 1991) as exemplified by trends such as the re-emerging popularity of the bicycle. According to the Worldwatch Institute (1994), bicycle sales have grown (worldwide) to the extent that 1 in 3 people now own a bike. Preoccupation

with paying debts and getting value for money as well as new lifestyle choices are reported to lie at the root of these changes. Continuation of the trend towards deconsumption and voluntary simplicity may result in changing waste generation and composition, if sustained over the long-term.

These diverse opinions are not conclusive, and in some cases are contradictory. The anecdotal and analytical evidence offered above may result in changes in the waste stream.

5.5.2.2 IC&I Sector

Futurists predict that major changes to affect the IC&I sector will result from economic changes and technological innovation, both of which are described below.

Economic Changes

Three major economic changes are predicted over the long-term. These include:

- Globalization: The shift from a local economy to a global one is indicated by an increase in world trade. Since 1950, world trade has increased from $US 308 billion to $US 3.58 trillion in 1992 (Worldwatch Institute, 1994).

- A shift from a manufacturing to technology-based economy: At present, 70% of Canadians are employed in a "technology-based" economy (Beck, 1993) which features four key sectors including computers and semiconductors; health and medical technology services; communications and telecommunications, and instrumentation. Proponents of this theory cite as evidence, statistics showing that in Canada, from June 1989 to June 1992, the number of knowledge related jobs increased by 1.3 million whereas the number of manufacturing production jobs decrease by 919,000 (Beck, 1993).

- Incorporation of Environmental Accounting in Business Practices: As environmental accounting practices become more widely accepted, they may greatly impact on the types of goods and services available and influence those that appeal to the consumer.

Technological Trends

The growth of the information age and communications technologies will dominate technological development well into the next century, for example:

- computers will become even more prevalent in both industry and society in general (US consumers alone purchase 12.6 million computers annually, which is expected to double by the year 2000) (Betts, 1994);

- the availability of new/improved technology will create new consumer preferences. For example, less than one decade since the fax machine was first introduced, it was estimated that Americans owned over 5 million fax machines. The number is likely substantially higher in 1994 (Naisbitt & Aburdene, 1990:

- office equipment is now able to communicate with other pieces of technology resulting in a host of possible new applications, for example: computers to communicate with photocopiers; rural doctors to consult with urban specialists by sending high-resolution images of lab tests or X-rays and auto mechanics to consult with factory technicians through interactive television (Tapscott, 1994).

As certain resources continue to become more scarce and their prices increase, technologies will develop that use these resources more efficiently and reduce waste.

The "high-tech" age is also predicted to produce more computer and other electronics related waste. For example, consumer preference for state-of-the-art technology is expected to result in disposal of 150 million personal computers by the year 2005 (Betts, 1994).

5.5.3 Role of Future Waste Generation and Composition in this Study

The estimates presented in the GTA 3Rs analysis have assumed that future waste generation will be similar to the generation (expressed as tonnes/capita and tonnes/ employee) experienced in the last six to seven years. It has also been assumed that some source reduction of these generation rates will occur over time.

Future waste composition is more difficult to predict, as it depends on factors such as changes in lifestyle patterns, economic trends, and technological transformations. Over the next 20-25 years, future residential waste composition will be determined partially by

attitudes and behaviours towards consumption, which are expected to reflect changes in lifestyle habits and technology. Similarly, future IC&I waste composition will depend on how our commercial and industrial base changes over the next 20-25 years. However, these changes and their impacts are not known.

Because of the uncertainty associated with future waste composition estimates, this study has been carried out assuming that generated waste composition will remain similar to that which is currently experienced. This is a conservative approach, that is considered more reliable and defensible than assuming a waste composition trend based on assumptions which may or may not occur.

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6.0 3Rs SYSTEM DEVELOPMENT

6.1 Introduction

This chapter presents steps that were taken by the study team to develop alternative 3Rs systems for the residential and IC&I sectors. Following this, the detailed descriptions of the generic alternative systems are provided. Finally, detailed descriptions of each system, as they would apply to (or be applied in) each of the four GTA Regions analyzed in this study are also presented in this section.

6.2 Overview of the Alternative System Development Process

A range of six residential and six IC&I waste diversion systems were developed for comparison in the GTA 3Rs Analysis. In order to conduct this analysis, a methodical system development process was undertaken. The objective was to combine a wide range of alternative waste diversion components into logical systems which could potentially be used for waste diversion, without undue complexity, throughout the GTA. The method used for system development is illustrated in Figure 6.1.

The systems were developed to provide a basis for comparing alternative waste diversion approaches. **No attempt was made to analyze all possible systems, nor was this an attempt to provide conclusive recommendations of preferred systems for waste diversion in GTA Regions. The range of alternative systems developed was however considered to be reasonable for the GTA. It will also be the municipalities themselves who decide which system is most appropriate considering their own local issues/conditions.**

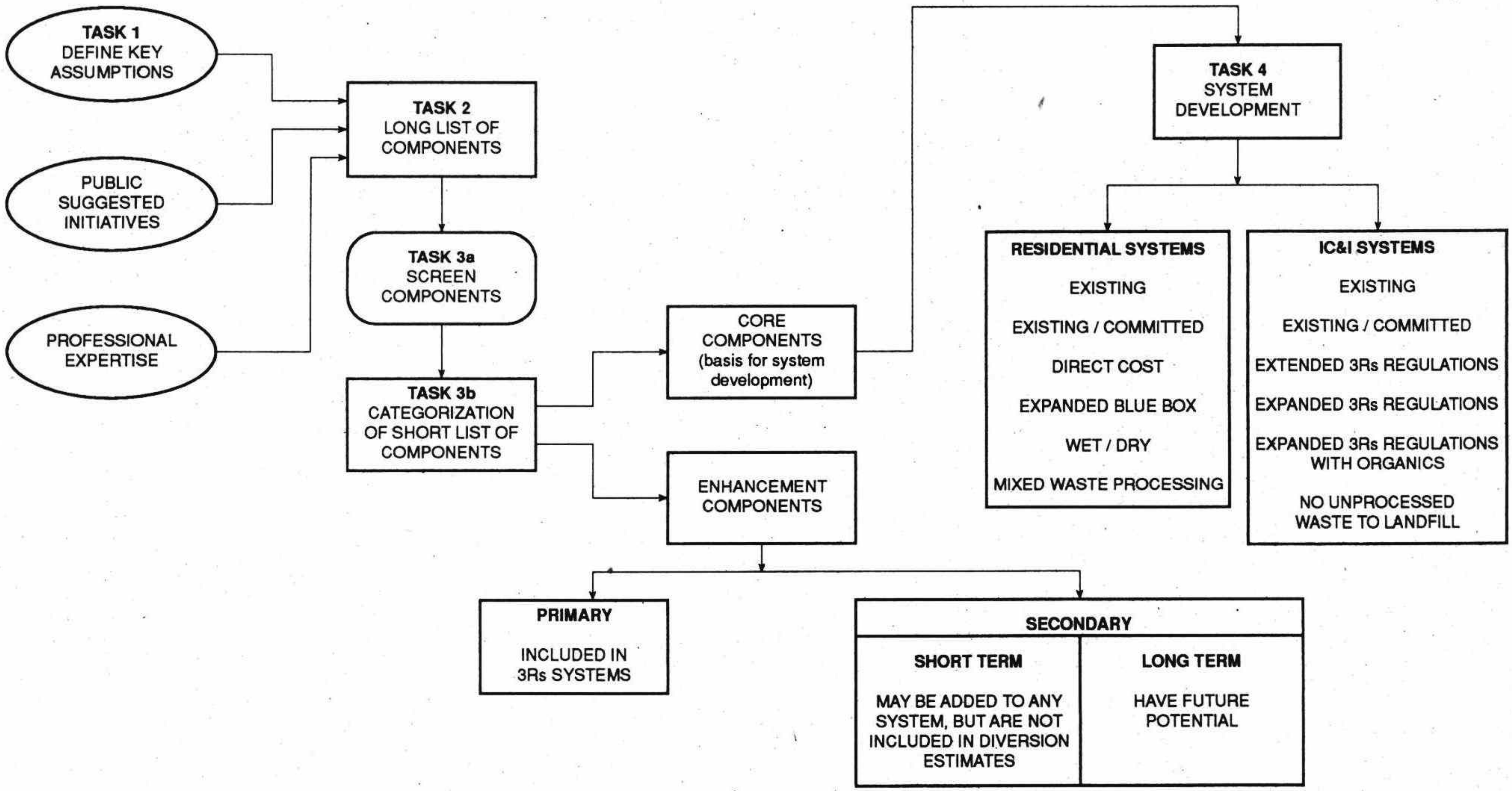
The system development process consisted of four key tasks:

1. Defining Key Assumptions
2. Identifying Long List of Components

3a. Screening Long List of Components
3b. Categorization of Short List of Components

4. System Development

The following discusses each of these tasks.



GTA 3Rs ANALYSIS
3Rs SYSTEM DEVELOPMENT PROCESS

FIGURE 6.1

6.3 Task 1: Defining Key Assumptions

Several assumptions were necessary in order to develop alternative waste diversion systems that might be applicable to the GTA. The assumptions developed by the study team for this purpose are as follows:

- The Existing system would be defined as the 3Rs system in place within each regional municipality as of December 31, 1992;
- Commitments made through five year regional and municipal budgets and Federal and Provincial policies announced by 31 December 1992 which were considered likely to occur, and were termed the Existing/Committed system. While each of the four regional Municipalities would be affected by the same Federal and Provincial commitments, they differed with respect to regional, municipal and private sector commitments;
- A "long list" of waste diversion components would be developed (as explained in Section 6.4). This would be a list of any components that *could* theoretically be applied in any or each of the GTA regional municipalities for waste diversion.
- Residential and IC&I waste diversion systems would be developed separately for each GTA Region. However, because there is no effective waste management boundary for IC&I waste and recyclables (IC&I waste management crosses municipal boundaries), IC&I systems would be developed for the GTA as a whole.

6.4 Task 2: Identifying the Long List of Components

A "long list" of waste diversion components was developed for screening in this study. A "long list" is made up of elements which represent a variety of waste diversion technologies, policies, and techniques that may be incorporated in waste diversion systems.

The "long list" was developed from information from two major sources. The study team analyzed the Existing and Existing/Committed systems in the GTA to identify their essential component parts. This was combined with comments provided by the public and those based on professional judgement to develop a comprehensive "long list" of potential system components for further evaluation.

6.5 Task 3: Component Screening and Categorization

6.5.1 Task 3A: Component Screening

The component screening for Residential and IC&I components was guided by three criteria. For a component to be retained for further consideration, each criterion had to be satisfied. The criteria are described below:

6.5.1.1 Criterion 1: A component must represent a proven technology, technique, policy and/or program

This criterion is defined to represent technologies, techniques, policies and/or programs which have the intention of diverting waste and have been successfully implemented in at least one other jurisdiction (world wide). If a component is not successfully implemented at full scale at this time but was considered to have potential for successful implementation in the future, the component was retained as a "secondary enhancement long term component" (described below).

6.5.1.2 Criterion 2: A component must satisfy government policy, regulations and standards

This criterion addresses whether a given technology, technique, policy or program is consistent with stated government policy and also meets current regulations and standards. Components requiring new legislation or amendments to existing legislation were not necessarily screened out on this basis, provided that they would not contradict existing policy.

6.5.1.3 Criterion 3: A component must reduce the quantity of waste requiring final disposal

Under this criterion, a technology, technique, policy or program must demonstrate an ability to divert a reasonable amount (which was defined generally as at least 1% for the purpose of this study) of waste from disposal. If a component was known to be beneficial (e.g. promotion/education) but measured data on diversion impacts were not available, the component was retained for inclusion in the systems.

Components which met the screening criteria discussed above formed the "short list" of components which was used for system development for either and/or both of the Residential and IC&I systems.

6.5.2 Task 3B: Categorization of "Short List" Components

Waste diversion is an evolving field with new technologies and policies continually emerging. To provide the flexibility needed to fairly evaluate "new" components, a multi-level component categorization system was used. It helped ensure that components which had future potential, but for which adequate data are not available at this time were not eliminated from future consideration.

Secondly, waste diversion systems contain many elements which can be combined in different ways to form systems. In order to limit the number of systems that could be considered to a manageable number, the study team developed a category of essential components for system development, and a second category of optional components which can be considered as a menu of options to add to any of the systems considered.

Categorization of components enabled the study team to specify the role that each component would play in development of alternative waste diversion systems for the GTA.

Components which had satisfied the screening criteria discussed above were classified as either Core components or Enhancement components. The purpose of each category is described below.

6.5.2.1 Core Components

Core components consist of a technique, technology or policy that could serve as the focus of a distinguishable alternative waste diversion system. Most core components consist of a type of technology (including collecting and processing elements) around which a system can be developed. As an example, collection of dry recyclables, and processing of dry recyclables in a MRF would be core components of an Expanded Blue Box program. If a specific policy was considered likely to contribute substantially to waste diversion system, it could also be retained as a core component. Therefore, some systems include regulatory measures or economic instruments as core components.

6.5.2.2 Enhancement Components

Enhancement components *could be* added to systems to enhance system performance and increase waste diversion. Enhancement components were further divided into primary and secondary enhancement component categories. **Only core and primary enhancement components were included in alternative waste diversion systems developed for analysis in the GTA.** A description of each enhancement component category is presented below:

Primary Enhancement Components

Primary Enhancement Components were used along with core components to build alternative waste diversion systems. These components (e.g. promotion and education) are proven to add an important element that would contribute to the function of a waste diversion system. The key distinction between primary and core components is that while core components can form the basis of a system, no system would be built around a primary enhancement component. In many cases, components that presently exist in GTA systems were included as primary enhancement components.

Secondary Enhancement Components

Secondary Enhancement Components were components that were considered to have potential for inclusion in the different systems developed. They could be added to systems to increase waste diversion but were not considered critical to their function. Because of this, no secondary enhancement components are included in the alternative waste diversion systems developed for this study.

The Secondary Enhancement category was further divided into:

Immediate Secondary Enhancement Components

These were components with immediate potential (e.g. landfill bans on leaf and yard waste, storage of recyclables, deposit systems, product stewardship) which could be added in the immediate future to enhance the performance of any of the systems considered.

Long Term Secondary Enhancements

These were components that indicated potential for waste diversion (e.g. funding incentives to product manufacturers) but may not have been fully proven at this time. These were classified as long term secondary enhancement components and were retained for future consideration.

Table 6.1 summarizes the defining features of each component category.

TABLE 6.1
SUMMARY OF COMPONENT CATEGORIZATION PROCESS

Component Category	Role	Defining Feature	Comments
Core Component	Included in alternative systems	Provides basis for waste diversion system development	
Primary Enhancement Component		Used with core components to develop complete waste diversion system	Component lacks ability to form basis of an alternative system on its own Components that offer less than 1% diversion but are still considered beneficial may be retained up to this level
Secondary Immediate Enhancement Component	Not included in alternative systems	Components indicate immediate potential but are not crucial to function of any one system	Components not included in any waste diversion systems developed for GTA 3Rs Analysis, but could be added to systems to enhance performance
Secondary Long-Term Enhancement Component		Components are not proven at this time but may have potential over the long term	Components not included in any waste diversion systems developed for GTA 3Rs Analysis

This resulted in a list of 19 core and 55 primary enhancement components which were used to develop waste diversion systems for the GTA 3Rs Analysis.

Table 6.2 at the end of this chapter presents the "long list" of components analyzed in this study and the results of the component screening and categorization process.

Table 6.3 at the end of this chapter presents an estimate of the waste diversion potential that could be achieved by each of the secondary enhancement components, should these components be added to any of the alternative waste diversion systems studied in the GTA 3Rs Analysis, based on available data culled from a variety of studies. For some of the secondary enhancement components, reliable data is not available at this time, due to lack of study etc. Where this is the case it has been noted.

Schedule A of the Service Technical Appendix provides documentation and rationale for the diversion estimates presented in Table 6.3.

6.5.3 Existing and Potential 3Rs Components

Several system components were considered in the development of GTA waste diversion systems, as shown under the following headings.

RESIDENTIAL COMPONENTS	IC&I COMPONENTS
Reduction and Reuse (Residential and IC&I)	IC&I Hauling Recycling and Storage
Residential Recycling and Collection	IC&I Composting
Residential Leaf and Yard Waste Collection	IC&I Reuse
Residential Household Composting	IC&I Recycling Depots/Transfer Stations
Other Residential Waste Diversion	MRFs/Processing for IC&I Sector
Composting Facilities	IC&I Regulation
Reuse Centres	IC&I Programs
Processing	IC&I Promotion/Education
Residential Recycling Depots/ Transfer Stations	IC&I Economic Incentives
	IC&I Market Development Policies
Residential Regulation	
Residential Programs	
Residential Promotion /Education	
Residential Economic Incentives	
Residential Market Development Policies	

The range and type of components considered are described below.

Reduction and Reuse (Residential and IC&I)

Reduction components prevent waste from being generated and requiring management by the diversion or disposal system.

Reuse components refer to the use of a material (which would otherwise have been discarded) in some beneficial manner without the need for additional processing to alter the state of the

material. There is significant overlap between reduction and reuse, hence these components are listed together. Examples of Residential and IC&I Reduction and Reuse components include:

- Funding/distribution of source reduction equipment (backyard composters, cloth shopping bags etc.);
- A change in package design to reduce the quantity of packaging waste generated by the consumer;
- Create waste reduction offices in each Region with the primary objective or promoting reduction and reuse; and
- Process change in manufacturing to reduce the quantity of waste generated.

Residential Recycling and Collection

Residential Recycling and Collection components involve systems for collecting secondary materials from households for processing and diversion. For example:

- Curbside collection of Blue Box materials (bag, cart).

Residential Leaf and Yard Waste Collection

Residential Leaf and Yard Waste Collection refers to the systems for collecting these materials from residential sources for processing, such as:

- Seasonal curbside collection of leaf and yard waste.

Residential Household Composting

Composting can be used to process most organic components of the waste stream. Composting can be carried out at the point of generation, (as in backyard or community systems) or at a centralized facility.

Other Residential Waste Diversion

Other residential waste diversion components include systems for collecting or providing alternatives to disposal for materials that are not usually incorporated in traditional Blue Box processing. For example:

- White goods collection and drop-off.

Composting Facilities

There are several different techniques used in centralized composting that form composting facility components including, for example:

- Centralized windrow composting of source separated organics.

Reuse Centres

Reuse centres provide formal opportunities for residential and IC&I goods exchange and reuse. This component includes:

- Social Service Centres;
- Reuse Building Centre;
- Waste Exchange, etc.

Processing

These components address processing of dry recyclables and other dry materials into a form suitable for use by secondary materials markets. An example would be:

- Processing of source separated or commingled dry recyclables in a material recovery facility (MRF).

Residential Recycling Depots/Transfer Stations

These components are comprised of opportunities for residents to bring materials to designated locations for processing and/or diversion including:

- Providing adequate depots for all neighbourhoods in GTA to complement existing Blue Box system.

Residential Regulation

Regulatory components have been divided into municipal, provincial, and federal categories. These regulatory components are designed to increases the diversion of residential waste by requiring some actions and activities on a mandatory basis. An example includes:

- No landfilling or incineration of unprocessed wastes.

Residential Programs

Residential program components describe programs that could be used by a Region to permit or compel residents to participate more fully in waste diversion or to round out an existing system. For example:

- Allowing residences to refuse delivery of unwanted "junk mail".

Residential Promotion/Education

Education of householders and promotion of 3Rs programs are considered the cornerstone of any successful 3Rs program and include components such as:

- Developing strong consumer education program to encourage bulk buying, refuse excess packaging, promote re-use, buy recycled, promote refillable containers etc.

Residential Economic Incentives

Residential economic incentives are regulatory actions that can be used to encourage participation in waste diversion activities, for example:

- Direct Cost system for garbage collection at curbside.

Residential Market Development Policies

Residential market development program components would be applied by a municipality to create markets for secondary materials and thus strengthen the economic viability and sustainability of 3Rs programs. For example:

- Integrating waste diversion with economic development programs to create markets for secondary materials.

IC&I Hauling, Recycling and Storage

IC&I Hauling and Recycling refers to components that involve the various systems for collecting secondary materials from IC&I locations for subsequent processing and diversion such as:

- Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.).

IC&I Composting

Composting can be used to process the wet (food and yard waste) part of the IC&I waste stream. Composting may be carried out at the point of generation, (as in on-site composting) or at a centralized facility. An example of an IC&I composting component includes:

- On-site composting of IC&I organics (vermi-composters and other by restaurants, schools, grocery stores, etc.).

IC&I Reuse

IC&I Reuse involves the second "R" of the 3Rs hierarchy, and includes materials exchange and reuse, to continue use of material in its original form. This component includes:

- Ontario Waste Exchange; and

- Use of refillable, reusable packaging (e.g. plastic pallets).

IC&I Recycling Depots/Transfer Stations

This component describes an opportunity provided to IC&I operations to bring materials to designated sites for subsequent processing and/or diversion, and includes:

- Provide adequate depots and transfer stations to be used by small IC&I generators to complement existing Blue Box system.

MRFs/Processing for IC&I Sector

These components address processing of dry recyclables and other dry materials generated in the IC&I sector to a form suitable for sale to secondary materials markets. Examples include:

- Processing of source separated or commingled dry recyclables in a material recovery facility.

IC&I Regulation

This section includes components designed to increase IC&I involvement in waste diversion, for example:

- Mandatory source separation of IC&I recyclables (3Rs) regulations.

IC&I Programs

IC&I program components describe "miscellaneous" programs that may be used to encourage or facilitate fuller participation by elements of the IC&I sector in waste diversion. For example:

- Changing approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval.

IC&I Promotion and Education

Education and promotion are considered cornerstones of any successful 3Rs program and include components such as:

- Expand strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc.).

IC&I Economic Incentives

IC&I Economic Incentives are regulatory or self-generated actions that can be used to encourage participation in waste diversion activities among segments of the IC&I sector. For example:

- Economic incentives to encourage product re-design for durability, recyclability, and refillability.

IC&I Market Development Policies

IC&I market development components would be applied to create markets for secondary materials and thus increase the economic viability and sustainability for waste diversion. For example:

- Funding and incentives to recycling industries or other industries that utilize secondary materials.

6.6 Task 4: System Development

6.6.1 Residential System Development

A set of six representative residential waste diversion systems was developed from the short list of core and primary enhancement components. The systems presented in this study do not span the full range of potential waste diversion systems that could be considered, and development of these particular systems does not imply a preference on the part of the authors.

The systems provided a basis from which to examine the potential for different approaches to waste diversion in GTA municipalities, but do not present a complete list of possible permutations and combinations of waste diversion system components to optimize diversion.

The Existing system was in place at the end of 1992. Any commitments made for waste diversion, at all levels of government, were incorporated into the Existing/Committed system for each reigion. Four additional residential waste diversion systems, which present an array of distinctly different technological and/or policy-driven approaches to residential waste diversion were also developed. Components which were identified as "core" in Table 6.2 were combined with those identified as "primary enhancement components" to form these four additional residential waste diversion systems, which were:

- a Direct Cost system;
- an Expanded Blue Box system;
- a Wet/Dry system; and
- a Mixed Waste Processing system.

A description of the six residential waste diversion systems analyzed is presented below. Further details of the residential systems are presented in Chapters 5 to 10 of the Service Technical Appendix.

6.6.1.1 Residential System 1 - Existing

All Regions provide curbside collection of Blue Box materials to most of their single-family residents. The range of materials varies from the basic list of materials (ONP, glass, tinplate steel, aluminum and PET), to an expanded list including some or all of the following materials: OCC, telephone books, magazines, textiles, plastics, etc. Some opportunities are provided to multi-family residents to recycle, either through provision of containers in multi-family buildings, or the provision of depots at convenient locations. Rural and self-haul households are served by depots at landfill sites and other locations.

All collected materials are processed in a series of MRFs which can be owned by either the Region or a private contractor. Operation of the MRF can be either by municipal forces, or by contract to the region.

Separate leaf and yard waste collection is generally provided on a seasonal basis, and these materials are composted at a series of open windrow composting sites throughout the GTA.

All Regions have aggressively promoted the use of backyard composters. These units are generally provided to householders at subsidized prices, and can be either picked up at regional facilities, or delivered at an extra charge. Some Regions are exploring appropriate approaches to composting for multi-family residents, but these efforts have not progressed significantly to date.

Additional waste diversion efforts include collection of Christmas trees, household hazardous waste and bulky goods such as white goods either curbside or through drop-off depots. A number of pilot projects have also taken place to explore the possibility of collecting household organics in the curbside collection system (Metro, Mississauga, Halton). No full scale household organics collection programs have been implemented to date.

Extensive promotion/education efforts have been on-going for some time, to improve participation in Blue Box and other recycling efforts, and also to encourage reuse and waste reduction as much as possible.

Existing residential waste diversion efforts diverted from 19%-22% to 28%-31% of the residential waste stream in all GTA Regions except Halton in 1992. Halton achieved an estimated 35% diversion of residential waste in 1992.

Material flow for the Existing system is shown schematically in Figure 6.2, along with the range of estimated diversion attributed to various system components in GTA Regions.

6.6.1.2 Residential System 2 - Existing/Committed

The Existing/Committed system includes the following major elements:

- commitments made in the regional five year capital funding budgets, (1994-1998) (or the 1993-1997 capital funding budgets if the most recent budgets were not available) which were considered likely to proceed by regional staff;

- policy commitments at the regional, provincial or federal level, which had been announced by the end of 1992.

The policy commitments considered part of the Existing/Committed system include:

- the provincial 3Rs Regulations, which were promulgated in March 1994;

- the National Packaging Protocol (NAPP), a voluntary program committed to by packaging users across Canada; and

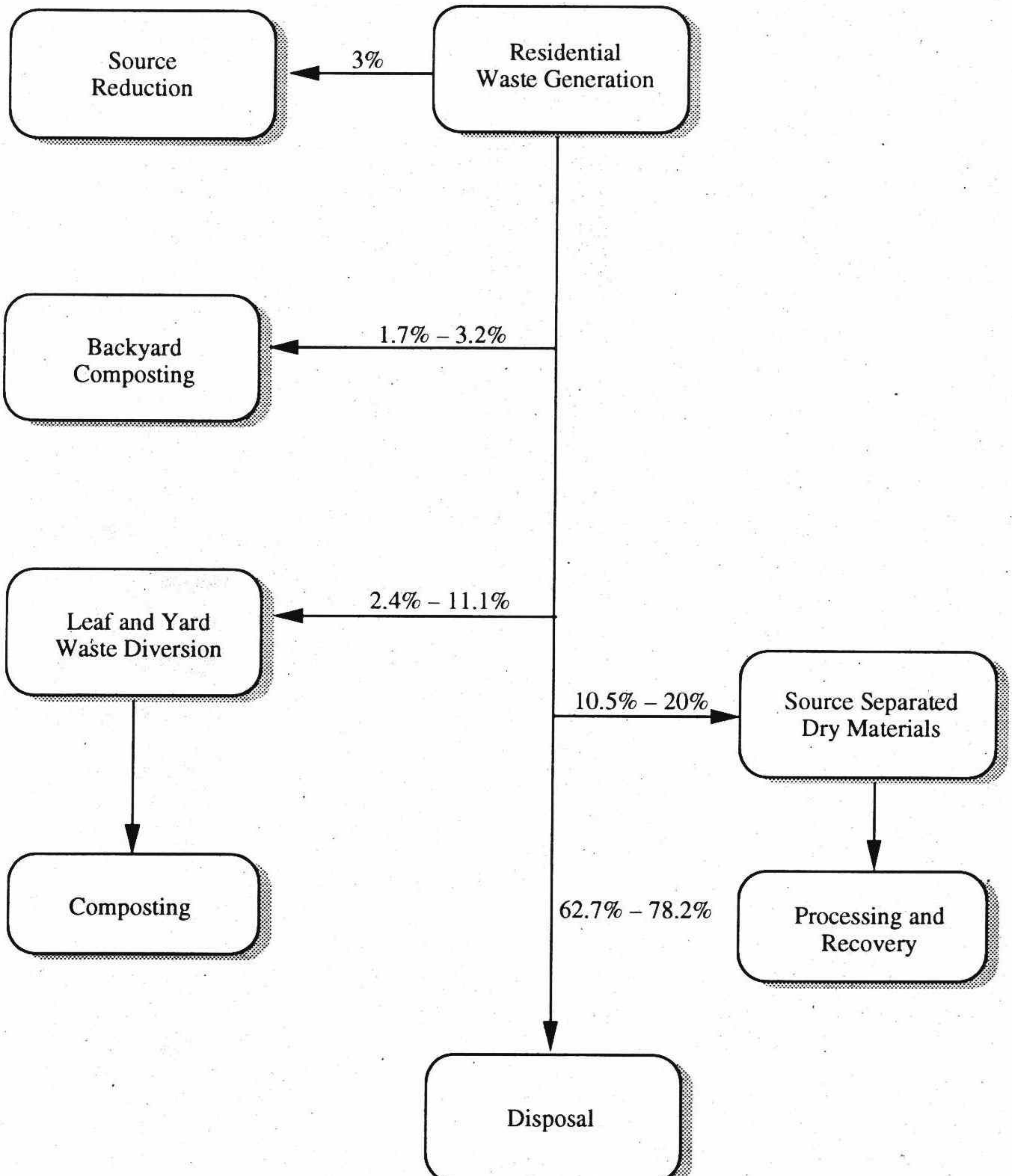
- the Canadian Industry Packaging Stewardship Initiative (CIPSI).

The provincial 3Rs Regulations (promulgated on 3 March 1994) have a number of requirements for municipalities. These include:

- source separation programs must be provided by all municipalities with a population of 5,000 or more;

Figure 6-2

Residential System 1 — Existing
Range of Diversion for GTA Regions (including Halton Region)



- if garbage is collected at the curbside from residential sources then recyclable materials must also be collected at the curbside. Frequency of curbside collection of recyclables must be at least half that of curbside garbage collection;

- if garbage is accepted from residential sources at a waste disposal site (depot or landfill) then measures must be put in place to accept recyclable materials at the site;

- all materials on the "basic list" (newsprint, food and beverage containers made of: aluminum, glass, PET, steel) and at least two materials from the supplementary list (aluminum foil, boxboard and paperboard, OCC, fine paper, foam plastics, polycoat, paperboard containers, magazines, plastic film, paper cups and plates, rigid plastic containers, telephone directories, textiles (excluding fibreglass, carpet)) must be collected;

- residents must be provided with instructions on proper procedures for source separation and feedback on how much material is being diverted from landfill;

- municipalities with a population of 5,000 or more must implement a backyard composting program, which must include the provision of home composters at cost or less, and a communications program;

- municipalities with a population of 5,000 or more must compost leaf and yard waste if they collect these wastes separately;

- municipalities of 50,000 or more must implement a leaf and yard waste collection system, and compost (or directly land apply) the diverted materials. The collection system must provide reasonably convenient service, and can consist of curbside collection, the provision of depots, or a combination of both;

- owners of multi-unit buildings with six or more dwelling units are required to provide a source separation program, if the building is located in a municipality with a population of 5,000 or more. The materials to be collected include: food and beverage containers made of aluminum, glass, steel or PET; newsprint and other types of materials which are collected in the local municipal Blue Box program. Municipalities must collect recyclables from residential sources including apartment buildings.

Most GTA municipalities meet most of the requirements of the 3Rs Regulations for collection of dry recyclables at this time, therefore the incremental diversion impact of meeting the requirements will not be significant. Most GTA municipalities provide some level of leaf and yard collection, and where additional service is required, this can be provided by a combination of curbside and depot service. All GTA municipalities provide backyard composting programs, therefore significant additional effort will not be required to meet the requirements of the 3Rs Regulations. Additional service will be required at multi-family residences in buildings of six or more units which do not currently have a source separation program. Additional dry materials may be source separated as a result of this requirement. Municipalities will be required to collect these materials, and arrange for processing.

The National Packaging Protocol (NAPP) is a federal program that established targets of 20% packaging waste reduction by 1992, 35% by 1996 and 50% by 2000, compared with packaging disposal in 1988. The initiative, which is co-ordinated by the Federal Government, seeks to draw industry into a voluntary process of packaging reductions. Policies were established through NAPP to ensure that packaging has minimal effect on the environment, is managed through 3Rs, and that promotion and education is provided to increase public awareness of the environmental impacts of packaging. NAPP applies to domestic as well as imported packaging.

NAPP is monitoring achievements attributable to the program and has recently produced its first *Milestone Report*. (National Task Force on Packaging, 1993). This report is based on responses from 32 industry sectors across the country, reporting on production, use, reuse and recycling of 32 packaging material types. While all goals are not yet met, according to NAPP, a 21% reduction in the amount of packaging has been achieved, with varying degrees of progress among different material types.

The Canadian Industry Packaging Stewardship Initiative (CIPSI) is a product stewardship program that has been organized by a coalition of leading Canadian manufacturers, material suppliers, and retailers. This group has proposed a national recycling program to achieve a 50% reduction in all packaging going to disposal. A key element of the CIPSI plan is to provide economic incentives which reward the use of highly recyclable materials . CIPSI encompasses a significant market development component and proposes a system of industry levies in which each industry member pays a fee in proportion to the actual costs of managing their packages that would be collected under the product stewardship scheme. This model would incorporate market development incentives with a rebate paid to industry members who are able to utilize secondary packaging

The CIPSI model has been accepted in Manitoba, and is currently under negotiation in Ontario, B.C. and Nova Scotia. If implemented, backdrop regulations would likely be

developed that require all companies who sell consumer products in a province to belong to an organization which recovers and recycles the used packaging. Both NAPP and CIPSI are ongoing initiatives that are likely to impact on the generation and recovery of packaging waste by the residential sector.

Material flow for the Existing/Committed system is shown schematically in Figure 6.3, along with the range of estimated diversion attributed to various system components in GTA Regions.

6.6.1.3 Residential System 3 - Direct Cost

The objective of the Direct Cost system is to provide an economic incentive to residents to make maximum use of source separation and diversion methods available in the Existing/Committed system at no direct charge to the householder at no direct charge to the householder.

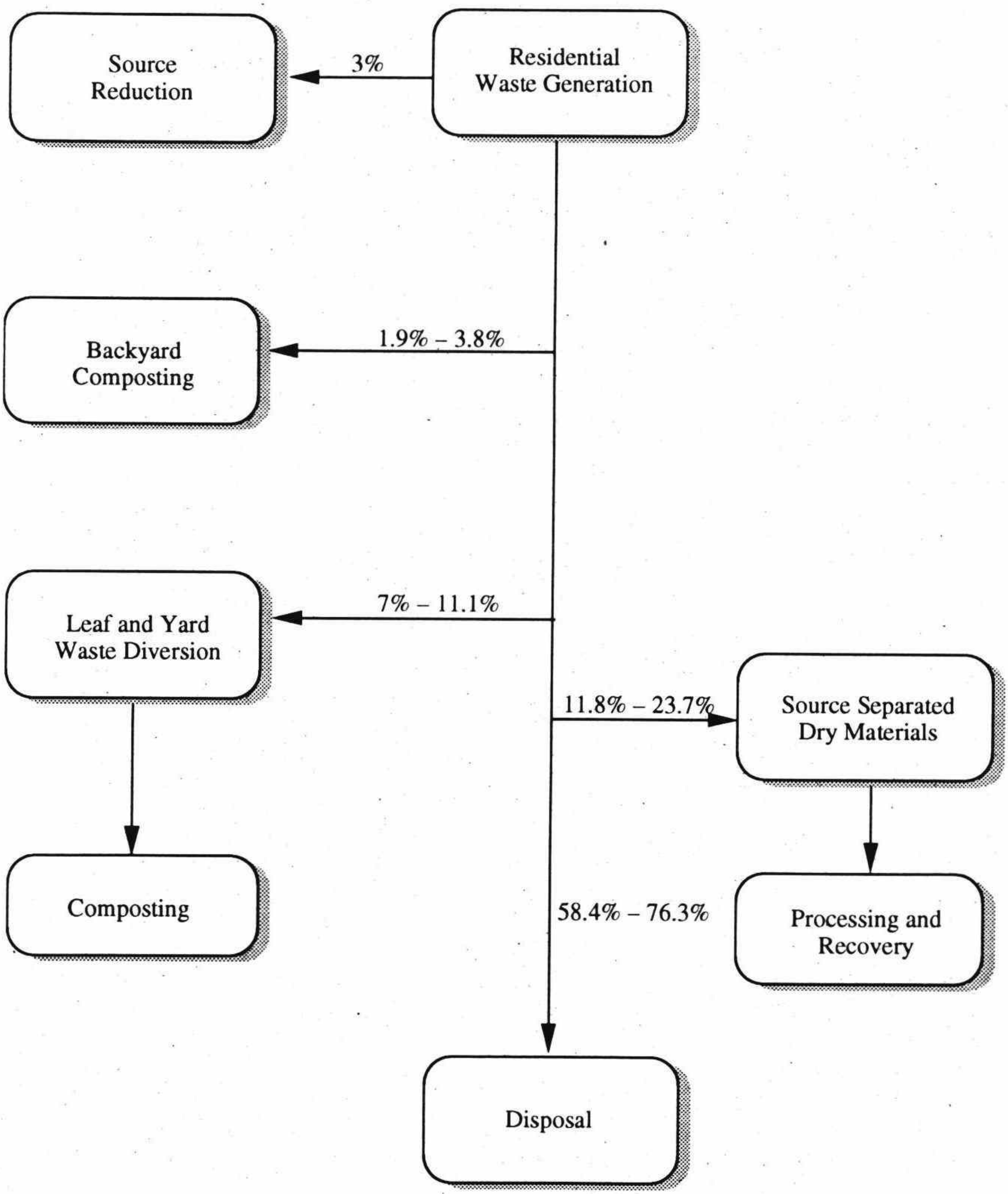
The Direct Cost system would build on the Existing/Committed residential waste diversion system. Single-family residents would pay a fee for garbage disposal in a pay-by-the-bag system. Blue Box collection of dry materials and seasonal collection and composting of leaf and yard waste would continue at current levels of service, and would be provided at no direct charge to the householder. Backyard composting would be aggressively promoted, by door-to-door delivery (possibly at no charge or at a nominal charge) of units. Composting by multi-family residents would also be encouraged, through promotion of community composting and vermi-composting.

Key features of a Direct Cost system include:

- it creates an economic incentive for waste reduction;
- residents realize direct cost avoidance through waste reduction;
- residents pay in proportion to the wastes generated.

Figure 6.3

Residential System 2 — Existing/Committed
Range of Diversion for GTA Regions (including Halton Region)



- it may be initially be received negatively by the public;
- it may discriminate against low income or high occupancy households;
- it requires complex administration and can often be expensive to implement and operate;
- it may lead to illegal dumping and burning of garbage;
- it may be difficult to control some of the problem elements (such as over-stuffed and heavy bags/containers);
- it does not generally impact on multi-family residents whose garbage is generally managed by the building owner and private contractors.

There are many types of Direct Cost system, described in the Service Technical Appendix. For the GTA analysis, it was assumed that a simple pay by the bag (or tag) system would be implemented at a cost of $1.00 per bag/tag. This is close to the actual cost of garbage management (Proctor and Redfern, 1993, RIS 1990). The system would be supplemented with a strong promotion/education campaign to encourage the 3Rs, and explain the benefits and fairness of a Direct Cost system. This system impacts on diversion behaviour of single-family residents, but does not impact on multi-family residents, as their garbage is managed by the private sector.

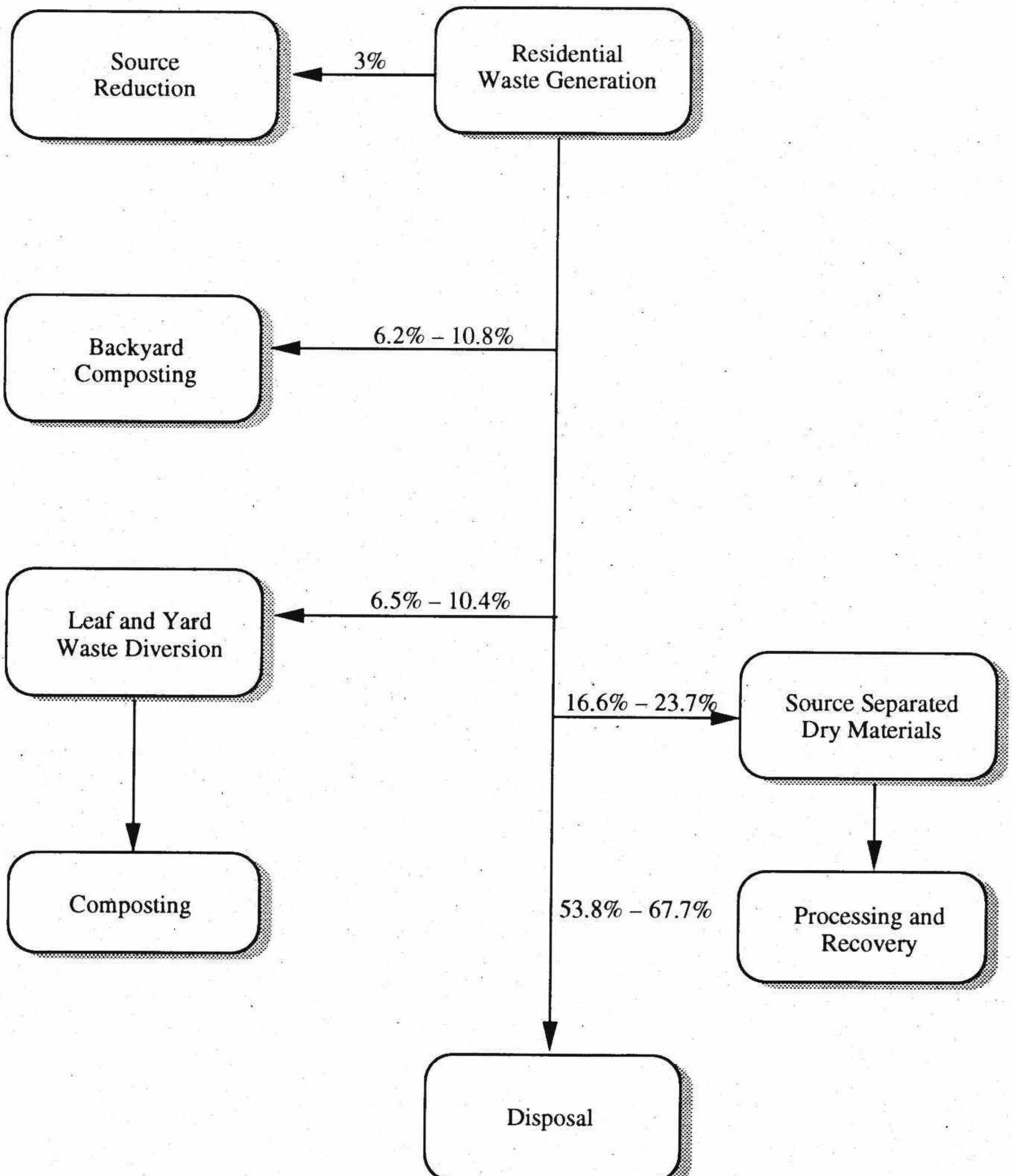
Material flow in the Direct Cost system is shown schematically in Figure 6.4, along with the range of diversion estimates in GTA Regions, attributed to the various components.

6.6.1.4 Residential System 4 - Expanded Blue Box

An Expanded Blue Box system is essentially Blue Box recycling incorporating an expanded range of dry recyclable materials. It attempts to achieve maximum diversion of dry recyclable materials using existing or modified facilities, and systems currently available to the Regions.

Figure 6-4

Residential System 3 — Direct Cost
Range of Diversion for GTA Region (excluding Halton Region)



This system would include extensive promotion of backyard composting, to allow residents the opportunity to divert organics from disposal. Separate collection of leaf and yard wastes would also contribute to diversion of organics. An extensive promotion/education campaign would be required, to ensure that householders understand which materials are included in the expanded program, and also to encourage waste reduction, backyard composting and source separation of leaf and yard waste. Details of this system and other expanded dry material recycling programs are provided in the Service Technical Appendix.

This system is different from a three stream wet/dry approach (Residential System 5) in that it does not depend on central composting of household wet wastes as a component of the system.

The dry materials that would be collected in this system include:

- newspaper (ONP);
- corrugated cardboard (OCC);
- boxboard;
- polycoat (e.g. milk cartons);
- phone books;
- magazines and catalogues (OMG);
- mixed household paper;
- steel cans;
- aluminum cans;
- aluminum trays and foil;
- clear and coloured glass;
- PET;
- rigid plastic bottles & tubes (HDPE, PVC, PP, LDPE);
- film plastic (LDPE);
- foam plastic and rigid trays (PS);
- textiles.

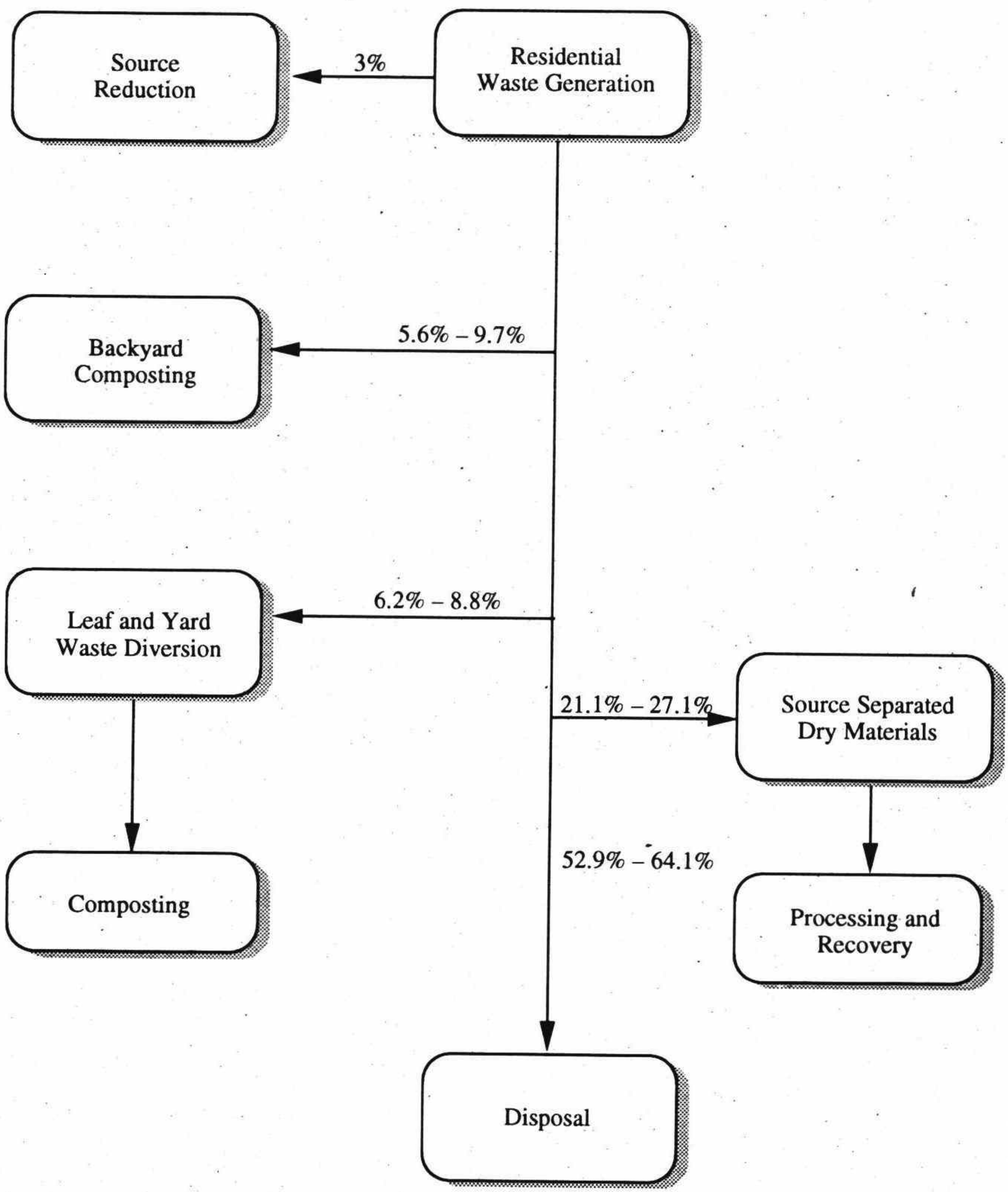
Material flow in the Expanded Blue Box system is shown in Figure 6.5

6.6.1.5 Residential System 5 - Wet/Dry System

The term "wet/dry" is commonly used to refer to a type of solid waste collection program where the householder is required to separate his or her waste into 2 distinct streams - the wet or the organic fraction, and the dry, which consists of fibres, plastic, metals, etc. The three-stream approach where householders separate waste into three streams: wet, dry and garbage was therefore used for system development and preliminary waste diversion estimates.

Figure 6-5

**Residential System 4 — Expanded Blue Box
Range of Diversion for GTA Region (excluding Halton Region)**



Implementation of a comprehensive three stream Wet/Dry system in GTA Regions would require all householders to separate their waste into three streams: wet wastes, dry recyclables and garbage. There are a number of three stream collection options available as described in the Service Technical Appendix. For the GTA 3Rs analysis, it was assumed that 240 litre (90 gallon) carts would be provided to all single-family households for the collection and storage of the wet waste, dry waste and garbage streams. New central in-vessel composting facilities would be required for processing of wet waste.

The viability of implementing successful three-stream collection of waste from multi-family units in GTA is somewhat uncertain at this stage, as the garbage management system in most older buildings is typically based on a single-chute system. Many buildings provide an option for recycling dry materials to residents by providing bins on the ground floor, or in the basement of the building, where source separated recyclables can be deposited. A similar approach would likely be necessary for three stream wet/dry collection, where an additional bin would be provided for voluntary separation of food waste. This would likely be delivered in sealed bags by residents. This option will only be possible in some multi-family residences, where space permits.

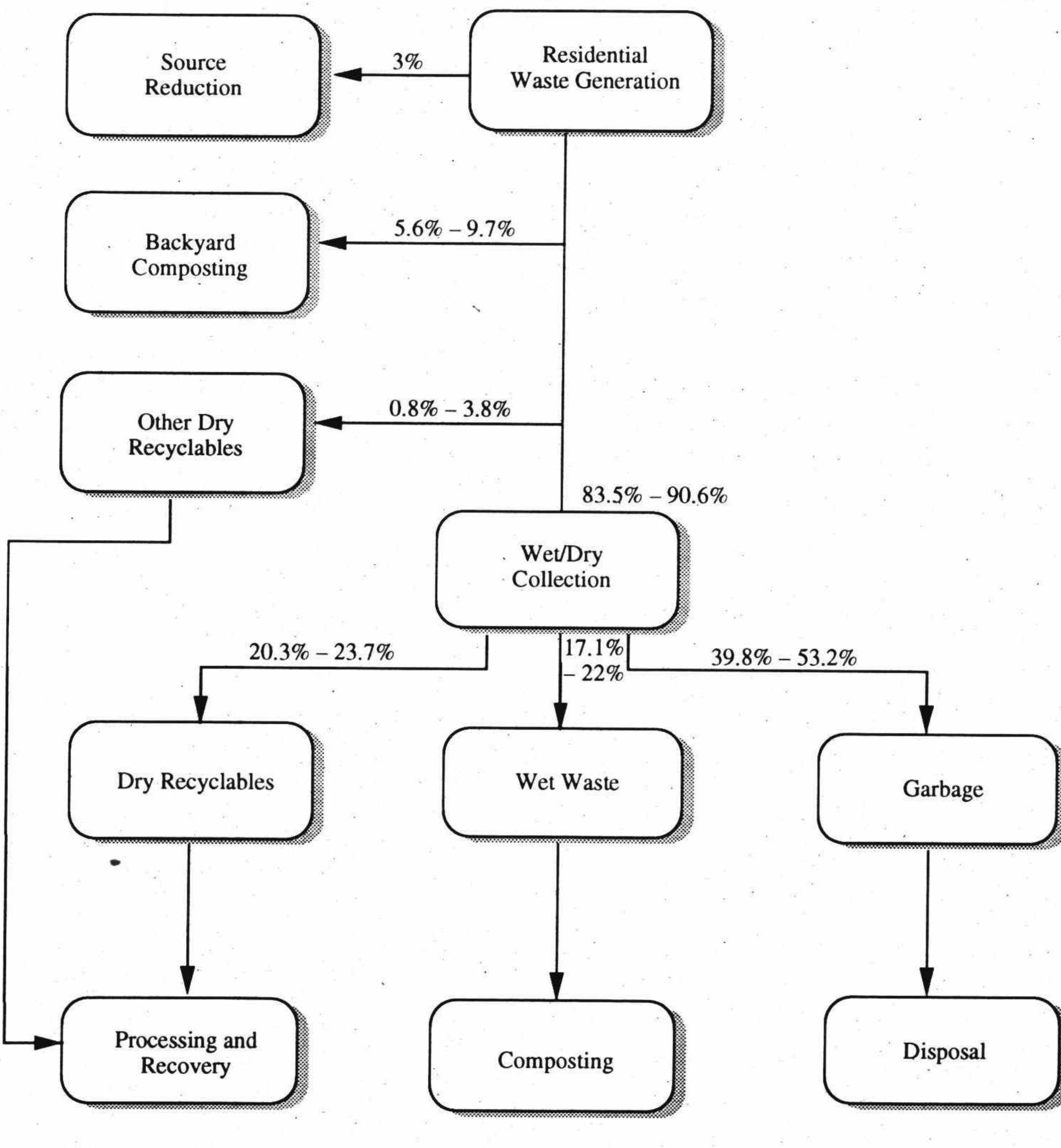
Backyard composting would be strongly promoted through door-to-door sales or delivery (possibly at no charge or at a nominal charge) of backyard composters. Leaf and yard waste would continue to be collected separately during the growing season. Separate collection of brush may be required because of capacity limitations. The system would also require extensive promotion/education, as it requires a significant change in habits for the householder. Wet/dry systems have worked successfully in Europe for a number of years, and have been tested on a pilot scale in Ontario. Some full-scale systems have been implemented in a number of small Canadian communities.

A variation on the Wet/Dry system was suggested by the Composting Council of Canada. This hybrid Wet/Dry system would collect the dry materials required to be source separated under the 3Rs Regulations, retain backyard composting at the levels of the Existing/ Committed system and would compost source separated household organics in a central composting system. This variant may be examined as a sensitivity to the Wet/Dry system.

Material flow in the Wet/Dry system is shown in Figure 6.6 along with the diversion estimates attributed to the various components in GTA Regions.

Figure 6-6

Residential System 5 — Wet/Dry
Range of Diversion for GTA Region (excluding Halton Region)



6.6.1.6 Residential System 6 - Mixed Waste Processing System

The Mixed Waste Processing system is an "add-on" to the Existing/Committed system for processing the "third bag" of waste which remains after recyclables and some leaf and yard wastes have been diverted in separation collections. The system would involve additional separation of dry recyclables at the mixed waste processing and composting plant, and composting of the remaining mixed waste stream.

Backyard composting would be aggressively promoted through door-to-door delivery (possibly at no charge or at a nominal charge) of units. Composting by multi-family residents would also be encouraged through promotion of community composting and vermi-composting.

One of the advantages of this system over others is that it provides the opportunity to divert waste disposed by multi-family dwellings.

In the 3Rs systems evaluations, two Mixed Waste Processing scenarios were considered: 1) System 6A - low quality compost, and 2) System 6B - high quality compost, referring to whether the compost would meet MOEE compost quality guidelines. These two scenarios address the different ranges of compost quality and end-use possibilities.

Material flow in the Mixed Waste Processing system is shown schematically in Figure 6.7, along with the diversion estimates attributed to the various components in GTA Regions.

6.6.2 Summary of Alternative Residential Waste Diversion Systems

To summarize, the alternative residential waste diversion systems analyzed are characterized as follows:

Residential System 1 - Existing - is based on the status quo, i.e. the residential waste diversion system which was in place in each GTA regional municipality on 31 December, 1992;

Residential System 2 - Existing/Committed - policies announced by December 31, 1992 (including 3Rs Regulations) and waste diversion programs committed in most recent regional five-year budgets (to the end of 1997 or 1998) that were considered likely to proceed by regional staff and study team;

Residential System 3 - Direct Cost - an alternative built on the Existing/Committed system which includes a direct charge to the homeowner, for garbage collection and provides an incentive to increase waste diversion;

Residential System 4 - Expanded Blue Box - a system where the range of dry recyclables collected at the curb are expanded and household organics (food and yard waste) are managed through backyard composters and separate collections of leaf and yard waste;

Residential System 5 - Wet/Dry - household waste is collected in three streams including wet food and yard wastes, dry recyclables, and garbage, with central composting of wet wastes;

Residential System 6 - Mixed Waste Processing - builds on the Existing/Committed system and which includes Blue Box collection of recyclables, separate collection of leaf and yard waste, backyard composting of some household wet wastes and processing of the remaining "third bag" of waste in a Mixed Waste Processing and composting plant.

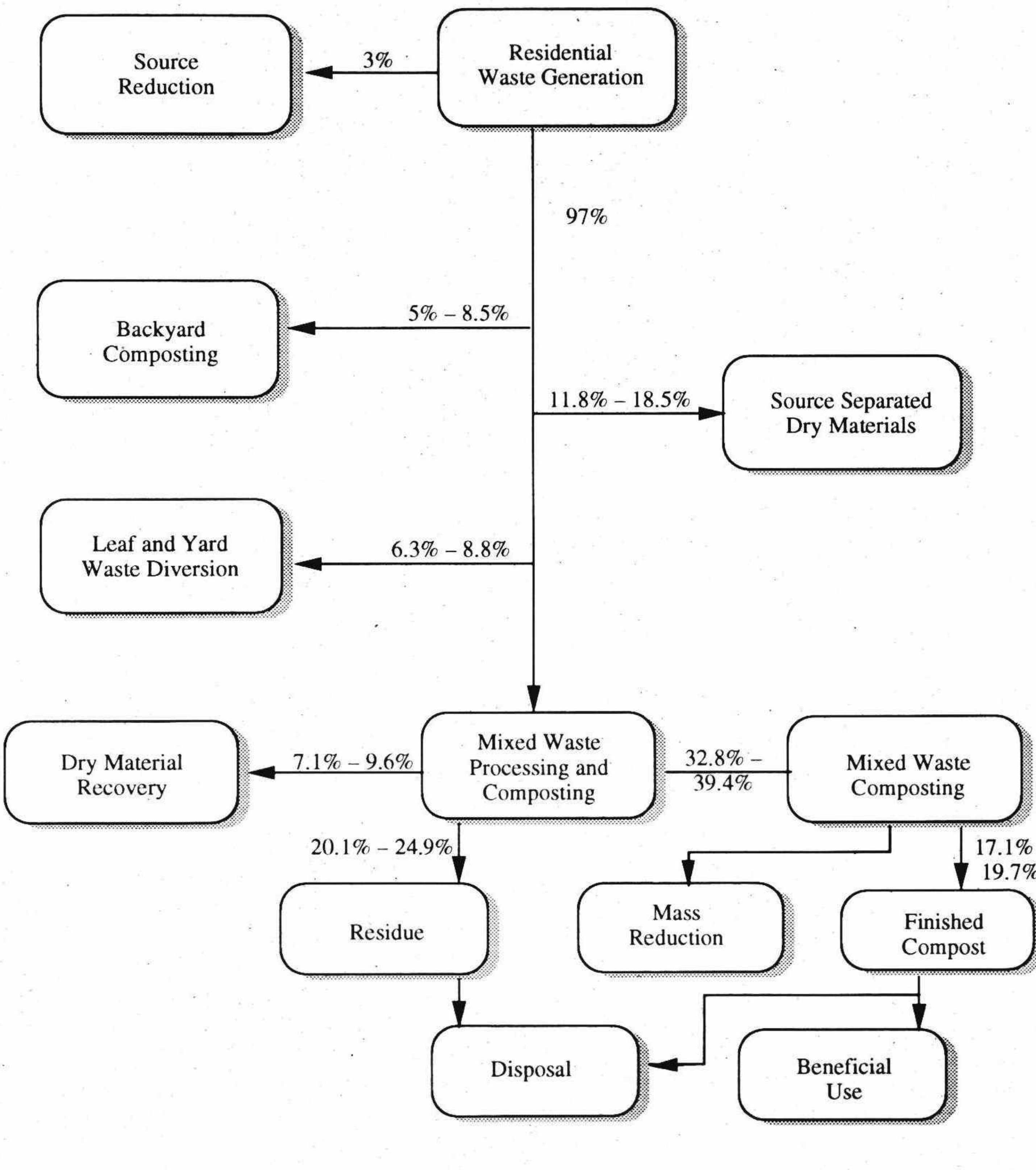
6.6.3 IC&I System Development

A set of six representative IC&I waste diversion systems was developed from the short list of core and primary enhancement components. As with the Residential systems, a group of potential alternative systems was assembled as a combination of waste diversion components which could be added to the Existing or Existing/Committed IC&I waste diversion systems to reduce the amount of waste which is currently disposed. The systems provided an analytical basis from which to examine the potential for different approaches to divert IC&I waste in GTA municipalities, but do not present a complete list of possible combinations of waste diversion system components to optimize diversion.

The Existing system was based on the system in place in the GTA at the end of 1992. It was adopted as the "do-nothing" alternative. Any policy and program commitments made for waste diversion, at all levels of government, and by the private sector were incorporated into the Existing/Committed system. This includes short term (e.g. 1993 - 1997) commitments which incorporate the impacts of the proposed Provincial 3Rs Regulations and NAPP.

Figure 6-7

Residential System 6 — Mixed Waste Processing
Range of Diversion for GTA Region (excluding Halton Region)



In addition to these two systems, four additional alternative systems were developed. Because waste management in the IC&I sector is predominantly conducted on a private basis, a regulatory approach which can cover all IC&I generators, is a comprehensive method by which diversion can be increased. For this reason, the IC&I systems focus on regulatory measures which could be implemented to increase the quantities of IC&I waste diverted.

Again, components which were identified as "core" in Table 6.2 were combined with those identified as "primary enhancement components". Together, these combined to form four alternative IC&I waste diversion systems, which were:

- an Extended 3Rs Regulations System;
- an Expanded 3Rs Regulations System;
- an Expanded 3Rs Regulations with Organics System; and
- a No Unprocessed Waste to Landfill System.

A description of the six IC&I waste diversion systems analyzed is presented below. Further details of the IC&I waste diversion systems are presented in Chapter 12 of the Service Technical Appendix.

6.6.3.1 IC&I System 1 - Existing

This system is based on the IC&I waste management system which was in place in GTA at the end of December 1992. At that time, waste diversion by the IC&I sector was carried out on a voluntary basis. Tipping fees at GTA landfills were $150/tonne for the private sector, causing significant export of waste to the US. A number of landfill bans throughout the GTA also limited the materials which could be disposed in landfills (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.).

Opportunities to recycle were provided to small IC&I generators through some municipally run depots. Two municipalities (Caledon and City of Toronto) provided some municipal collection of IC&I recyclables. Processing of some IC&I recyclables was also provided by some municipally-run MRFs.

Collection and processing of a wide range of source separated dry recyclables from the IC&I sector was provided by many private sector haulers and recyclers, some of which owned and operated processing facilities.

Collection and processing of wet wastes generated by the IC&I sector was provided by the private sector (e.g. centralized windrow composting - Scotts Farm, rendering of food wastes, collection by farmers for landspreading and animal feed, etc.). In addition, redistribution of

food wastes from the IC&I sector was carried out through organizations such as Second Harvest and food banks.

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, WASTEWISE, Halton, etc.)

Voluntary waste reduction initiatives were pursued by individual IC&I establishments. These include implementation of source separation and recycling programs, carrying out waste audits, and developing waste reduction action plans, which included reduction, reuse and recycling elements.

The National Packaging Protocol (NAPP), a federal initiative, required that packaging waste generation be reduced by 50% by the year 2000, measured against a 1988 baseline. NAPP is a voluntary program at this time. Private sector companies were complying with the spirit of NAPP on a voluntary basis as of the end of 1992.

6.6.3.2 IC&I System 2 - Existing/Committed

The Existing/Committed system includes the Existing system described above, and also the estimated impacts of any policy commitments announced at the local, regional, provincial and federal level by the end of 1992. These include the Ontario 3Rs Regulations, the National Packaging Protocol (NAPP) and the Canadian Industry Packaging Stewardship Initiative (CIPSI) as discussed in Section 6.6.1.2.

The Ontario 3Rs Regulations were promulgated in March, 1994. There are three requirements for IC&I waste generators under these regulations (Ministry of Environment and Energy, March 3, 1994). Designated major generators must:

- carry out waste audits and develop and implement waste reduction action plans;
- implement source separation programs;
- designated manufacturing facilities and importers must carry out packaging audits and develop packaging reduction work plans.

GTA IC&I facilities affected must comply with the 3Rs Regulations by September 1994.

Designated Major Waste Generators

The 3Rs Regulations will apply only to those IC&I establishments which are designated major waste generators. These include:

- retail shopping establishments with a floor area of at least 10,000 m^2;
- retail shopping complexes with a floor area of at least 10,000 m^2;
- construction projects with a total floor area of at least 2,000 m^2;
- demolition projects with a total floor area of at least 2,000 m^2;
- office buildings with a total floor area of at least 10,000 m^2;
- multi-family complexes containing 6 or more units;
- restaurants, if the total annual sales for all restaurants operated in Ontario by the owner equalled or exceeded $3 million in a calendar year within the previous two years;
- hotels and motels which have more than 75 units;
- hospitals classified as A, B, or F in Regulation 964;
- educational facilities with enrolment of 350 persons or greater;
- manufacturing facilities with employees that have worked, in total in excess of 16,000 hours on any calendar month during the preceding calendar years.

Source Separation Requirements

The regulations require that designated major generators of IC&I waste implement a source separation program covering a number of materials. Collection, handling and storage facilities must be provided for the materials specified. The generator must make reasonable efforts to ensure that source separated materials are reused or recycled.

The list of materials that is required to be separated varies among the different sectors, and is as follows:

Retail, office buildings, hospitals, educational	***Restaurants, hotels and motels***
• aluminum food and beverage cans • corrugated cardboard • fine paper • glass bottles and jars for food and beverages • newsprint • steel food and beverage cans	• aluminum food and beverage cans • corrugated cardboard • fine paper • glass bottles and jars for food and beverages • newsprint • steel food and beverage cans • PET

Multi-unit residential	*Large manufacturing*
• aluminum food and beverage cans • glass bottles and jars for food and beverages • newsprint • steel food and beverage cans • PET • other materials collected by local Blue Box program	• aluminum • corrugated cardboard • fine paper • glass • newsprint • steel • PET • HDPE, (jugs, crates, pails, totes and drums) • LDPE and LLDPE film • polystyrene foam • polystyrene trays, reels and spools • wood
Construction	***Demolition***
• corrugate cardboard • brick and Portland cement concrete • drywall • steel • wood	• brick and Portland cement concrete • steel • wood

Waste Audits and Waste Reduction Work Plans

The designated major generators must also carry out waste audits and develop waste reduction work plans. These must be posted and communicated to employees. They must be maintained on premises and submitted to MOEE upon request.

Packaging Audits and Packaging Reduction Work Plans

Under the 3Rs Regulations, large manufacturers of food, beverages, paper and chemical products (in SIC 10, 11, 27, and 37) with employees that have worked, in total, in excess of 16,000 hours in any calendar month during the two preceding calendar years, and importers of these products with annual sales in excess of $20 million, must carry out packaging audits and develop packaging reduction work plans. These must be done at least every two years. They must be summarized and communicated to employees.

Discussions with haulers and recyclers suggest that the existing infrastructure in GTA will be able to handle the increased quantities of source separated materials requiring collection and processing under the requirements of the 3Rs Regulations. Private sector haulers and recyclers are expected to be able to provide the increased services required. Existing processing capacity can likely handle the increased flow of materials, hence no new processing facilities are likely to be required.

6.6.3.3 IC&I System 3 - Extended 3Rs Regulations

This system would build on System 2, but would require a change in policy to extend the proposed 3Rs Regulations to include a significantly larger number of IC&I waste generators.

In this system the proposed 3Rs Regulations would be extended as follows:

- IC&I generators who account for 90% of the IC&I waste generated within the manufacturing, retail and wholesale sectors in Ontario (or the GTA) would be required to source separate an expanded list of materials (required only of major manufacturers in the current 3Rs Regulations). The expanded list would include: aluminum, OCC, fine paper, glass ONP, steel, PET, HDPE, LDPE film, polystyrene and wood. Mandatory waste auditing and waste reduction planning would also be required of these generators;

- the proposed requirements for source separation (of brick, OCC, portland concrete cement, drywall, steel and wood), and waste reduction work plan development would also extend to a much larger number of construction/demolition projects. Again, the cut off criterion would be chosen so that 90% of generated C&D waste would be subject to the regulations. It is estimated that these requirements would result in many smaller construction and demolition contractors having to comply with the regulations on smaller construction and demolition projects;

- in addition, food service and accommodation establishments would also be required to source separate PET;

- the packaging provisions in the 3Rs Regulations would remain unchanged, and would apply only to major generators in which the hours worked by employees in any month over the previous two years exceeded 16,000 hours in the SICs currently involved (SIC 10, 11, 27 and 37 and importers of these products with annual sales in excess of $20 million).

It is probable that 60-70% of IC&I generators account for 90% of IC&I waste generated in Ontario although this cannot be confirmed with the data available at this time. Choosing the 90% cut-off for extension of the regulations is estimated to relieve many small IC&I generators of the requirements of the extended regulations. If 100% of all IC&I generators were required to comply with the extended regulations, it would require significant effort on the part of many very small IC&I establishments, with marginal benefit in terms of increased waste diversion. Capturing generators of 90% of the waste stream under the extended 3Rs

Regulations is considered a more appropriate approach. This is similar to the municipal 3Rs Regulations, requiring communities with populations over 5,000 to provide recycling services to 90% of Ontario's population.

Each of the IC&I generators impacted by the Extended 3Rs Regulations would be required to institute source separation programs in their facilities. This would likely require the purchase of a number of recycling bins by each IC&I generator, for placement at strategic locations throughout the facility. Design of a recycling system for the facility, and development of a training program for facility staff, in order that they understand which materials go into which bins, would also be required.

The extent to which materials would be source separated in the IC&I facility would depend on the hauler, or recycler which services the IC&I facility. Some companies require separation into a number of different streams (e.g. glass, metal, plastic, fine paper, OCC, etc.) whereas other hauling/recycling companies use a two-bin system.

Because the total processing capacity of the existing private sector recycling system is not known (private sector companies contacted during this study were reluctant to divulge this information), it is unknown what expansions would be necessary to provide the additional capacity required. Also, the existing capacity of the private sector to provide recycling services is not known accurately, therefore the level of expansion of collection services necessary to meet the requirements of the Extended 3Rs Regulations can not be accurately estimated. The private sector would likely respond to provide the additional services and processing capacity required under this system, and always indicate their willingness and desire to do so. On this basis it is reasonable to assume that adequate capacity for source separated material collection and processing will be available in GTA.

An aggressive market development policy would be required to ensure that stable markets were created for the larger quantities of dry recyclables which would enter the secondary materials markets under this system. Market development policies which could be considered include: mandatory recycled content for a number of products (particularly packaging), mandatory purchasing specification development at all levels of government to create incentives for secondary material market development, support of green industries using secondary materials as feedstock, etc.

6.6.3.4 IC&I System 4 - Expanded 3Rs Regulations

This system would build on System 3 (Extended 3Rs Regulations), and would require the source separation of a larger range of dry materials. System 4 would apply to IC&I generators who account for generation of 90% of the IC&I waste stream (the same group as

for System 3) who would also be subject to the Expanded 3Rs Regulations. Identification of generators which would be involved was not carried out as part of this study, but it would likely apply to 60 to 70% of GTA generators. The Extended 3Rs Regulations system would require that the generators impacted source separate the following materials: aluminum, OCC, fine paper, glass, newsprint, steel, PET, HDPE, LDPE and LLDPE film, polystyrene, wood, and other paper products (which include boxboard and mixed papers).

The existing 3Rs infrastructure would likely require some expansion to handle the new materials which would be recycled under this system. Some new facilities (MRFs to handle a wide array of dry recyclables) and additional collection capacity (for dry recyclables) would be required. The additional plastics recovered in this system will require initiatives to encourage the development of cost effective separation and processing technologies.

This system would also require aggressive market development policies and actions to ensure that stable markets are created for the larger quantities of dry recyclables which would enter the secondary materials markets.

6.6.3.5 IC&I System 5 - Expanded 3Rs Regulations with Organics

This system is built on System 4 (Expanded 3Rs Regulations), and would additionally include wet wastes, or organics (7-8% of the GTA IC&I waste stream) in the regulated list of materials requiring source separation by the IC&I sector. Because most IC&I food wastes are generated by a few IC&I sectors (most notably food manufacturers, grocery stores, restaurants, hotels, hospitals, schools, etc.) the regulations would be structured to capture 90% of the IC&I organic waste stream, by targeting a few sectors. In addition, significant IC&I generators of yard waste (landscapers, garden maintenance companies, etc.) would be required to source separate and divert these streams from disposal.

Many IC&I food waste generators would have to implement source separation programs for food wastes. New recycling bins would have to be purchased and located strategically in kitchen and food preparation areas. Staff would be trained to put food waste into designated separate bins. In many cases, a separate company (to the hauler/recycler used for dry recyclables) may handle the source separated organics, which will require frequent removal from the property, because of potential odour generation. Where feasible, efforts may be made to compost the source separated food wastes on site.

Options for food waste diversion include use as human food, animal feed, landspreading, rendering and composting. The use of food banks and organizations such as Second Harvest would likely increase, depending on any health department restrictions involved. Existing landspreading and animal feed capacity within a reasonable distance of GTA are fixed, and

are not easily expanded. Rendering capacity can be expanded considerably, but may not be cost competitive with other management options. Existing composting capacity may be adequate, (depending on what proportion of the source separated waste was composted and whether some private sector facilities in the planning stages at this time will be constructed).

Source separation and diversion of organic (predominantly green) wastes by IC&I generators such as landscapers and garden maintenance companies is likely easier, as most of their waste is relatively homogeneous. Options in this case would be limited to direct land application or composting.

6.6.3.6 IC&I System 6 - No Unprocessed Waste to Landfill

This system would build on the Existing/Committed IC&I system, including the requirements of the provincial 3Rs Regulations and would require that all IC&I waste be processed prior to landfilling. New legislation mandating this requirement would be necessary, or the same result would be achieved if this requirement were included in the Certificate of Approval for GTA landfills.

There are a number of ways in which this system could and probably would operate. Major generators subject to the 3Rs Regulations would implement source separation programs. For wastes from other generators, haulers/recyclers would have the option of either requiring some level of source separation by their facility accounts, or picking up only one bin of mixed waste (garbage). The applicability of each approach might depend on the size of the account and the overall economics of extensive material separation versus disposing of all waste into one bin.

The level of processing carried out would depend on the wording of the regulations, and the economics of additional processing versus minimal processing and subsequent disposal from the haulers/recycler's point of view.

High processing and disposal costs might encourage increased source separation and negotiation of separate contracts for different materials on economic grounds. There are examples of this approach in the Existing system, where companies source separate OCC and negotiate for its separate collection by brokers. Also, some food service facilities allow farmers to haul away source separated food wastes at zero or minimal costs.

A variety of methods would be used to meet the requirements of this system. The combinations would include some source separation, and some processing of mixed waste. It would likely require additional processing facilities in the GTA for both source separated and mixed IC&I wastes (including specialized facilities for C&D waste).

The costs of waste management would increase, particularly for companies who opt for disposing of mixed waste without any source separation.

6.6.4 Summary of IC&I Waste Diversion Programs

To summarize, the alternative residential waste diversion systems analyzed are characterized as follows:

IC&I System 1 - Existing - is based on the IC&I waste diversion system that was in place in GTA as of 31 December, 1992.

IC&I System 2 - Existing/Committed - policies announced as of 31 December, 1992, including 3Rs Regulations which require that designated sectors conduct waste audits, packaging audits, develop waste and packaging reduction plans and implement source separation programs for specified materials and the National Packaging Protocol (NAPP).

IC&I System 3 - Extended 3Rs Regulations - a system built on System 2 that applies 3Rs Regulations to a much greater number of IC&I generators.

IC&I System 4 - Expanded 3Rs Regulations - a system that builds on System 3, and mandates source separation of a wider range of dry materials by the same group and number of IC&I generators identified in System 3.

IC&I System 5 - Expanded 3Rs Regulations with Organics - a system that builds on System 4, and requires designated IC&I generators to source separate and divert wet wastes (food waste, leaf and yard wastes).

IC&I System 6 - No Unprocessed Waste to Landfill - a system that builds on System 2 and would require that all material disposed as waste be processed (through any legitimate means) prior to landfilling.

6.7 Components of Residential and IC&I Waste Diversion Systems

6.7.1 Residential System Components

Six residential systems were developed and described for the Regions of Durham, Peel, Metro Toronto and York. The components of these systems are summarized in Tables 6.5 to 6.8.

The components of the Existing and Existing/Committed system for Halton are also included in Table 6.9.

Components italicized in the Existing and Existing/Committed systems are those components which must be added to provide the same level of 3Rs service throughout the study period (to accommodate projected population increases). This allowed all systems to be evaluated at a consistent point in time (i.e. the year 2000). Components italicized in Systems 3 to 6, are the components which have been added to the Existing/Committed system which is the base for systems development.

6.7.2 IC&I System Components

The IC&I systems were considered to apply to GTA as one unit, and were not addressed separately for GTA Regions. The components of each IC&I system are summarized in Table 6.10.

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
RESIDENTIAL											
1.0	**Reduction and Reuse (Residential and IC&I)**										
1.1	Funding/distribution of source reduction equipment (backyard composters, cloth shopping bags etc.)	exists to some extent in GTA Regions	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that component reduces waste and technology is proven
1.2	Create waste reduction offices in each Region with the primary objective of promoting reduction and reuse	exists to some extent in GTA Regions	likely effective, not proven in quantitative way	N/A	likely contributes to reduction in quantity of waste disposed over time		√				Retain on basis that offices currently exist and contribute to waste reduction
1.3	Establish community-based (i.e. municipal, non-profit, charitable, etc.) reuse/ repair and goods exchange centres	exists to some extent in GTA Regions	proven to divert waste from disposal	N/A	reduces quantity of waste disposed		√				Retain on basis that component is proven and can reduce quantity of waste disposed
1.4	Support the efforts of charitable organizations and food reuse organizations	exists to some extent in GTA Regions	proven to divert waste from disposal	N/A	reduces quantity of waste disposed		√				Retain on basis that charitable organizations contribute to reuse
1.5	Promotion of grass-cycling and xeriscaping	exists to some extent in GTA Regions	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component contributes to reduction of grass in waste stream
1.6	Landfill ban on leaf and yard wastes, to force increased management on residential property	not in GTA at present	proven	N/A	reduces quantity of waste disposed			√			Retain on basis that the component is considered a valuable enhancement to any diversion system since the component contributes to diversion of leaf and yard waste
1.7	Eliminate pick-up for leaf and yard waste (Oakville has implemented ban on grass pick-up)	exists in Halton at present	proven	N/A	reduces quantity of waste disposed			√			Retain on basis that component encourages homeowners to manage grass waste on site and contributes to diversion.
1.8	Increase use of refillable/reusable packaging and products	carried out on voluntary basis in GTA	proven	may require government regulations	reduces quantity of waste disposed			√			Retain on basis that the component decreases use of disposable packaging and products, and therefore contributes to waste reduction through reuse
1.9	Landfill bans on recyclable material	exists to some extent in GTA	proven	N/A	decreases quantity disposed in GTA landfills			√			Retain on basis that the component encourages increased recycling and therefore contributes to waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
1.10	Waste reduction planning requirements for construction/demolition projects	exists to some extent in GTA	likely to reduce quantities	required under MOEE 3Rs regulations	likely to increase use of secondary materials and reduce disposed waste over time			√			Retain on basis that the component encourages consideration of waste diversion in construction planning which will lead to waste diversion
1.11	Procurement ordinances (favouring durable products, recycled content, and/or reusable purchases)	exists to some extent in GTA	likely to reduce quantities	N/A	likely to increase use of secondary materials and reduce disposed waste over time			√			Retain on basis that the component promotes use of reusable and durable goods which reduces generation of waste, and assists in market development for secondary materials, which will increase demand and promote recycling over long term.
1.12	Local product or packaging bans	not in effect in GTA at this time	in place in state of Maine (aseptics); effects on generation of other wastes unknown (may increase waste generation)	N/A	may increase quantities disposed by causing shift to other more wasteful packaging					√	Screen on basis of uncertain and unproven waste diversion impacts
1.13	Promotion/education for school children focusing on waste reduction	in place in many/most GTA schools	proven	N/A	likely to have waste reduction impact over longer term		√				Retain on basis that this increases participation in existing waste diversion programs and will result in long term benefits (of consumer education)
1.14	Economic incentives such as Direct Cost for garbage disposal (see later section on economic incentives)	not in GTA for residential waste at this time	proven	Bill 7 provides necessary powers	reduces quantity of waste disposed	√					Retain as core component on basis that this provides strong economic incentives for waste diversion which has proven to increase waste diversion in many jurisdictions
1.15	Promotion/education program for consumers focusing on purchasing habit changes to minimize waste generation (for example bulk buying, borrowing items, buying products in recyclable packaging etc)	in GTA at this time	effect not measured, but likely to cause behaviour change over time	N/A	likely to reduce quantity of waste disposed over time		√				Retain on basis that the component promotes a change in consumption habits which results in decreased waste generation
1.16	Product redesign for increased product life and durability	uncertain of degree to which this occurs in GTA - products sold in GTA manufactured world-wide	increased durability would decrease discard rate	N/A	likely to reduce quantity of waste disposed over time			√			Retain on basis that the component results in decreased waste generation (due to longer product life)

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions (Durham Peel Metro York)	Screening Criteria: Unproven Technology or Techniques	Screening Criteria: Strategy Fails to Satisfy Government Regulations and Standards	Screening Criteria: Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Screening Conclusion: Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
1.17	Packaging redesign to reduce quantity and weight (light weighting)	parts and packaging sold in GTA manufactured world-wide, some packaging redesign underway by Canadian companies to comply with NAPP	will reduce packaging waste (which is 30% of residential wastes)	NAPP, a voluntary federal initiative; already targets packaging waste	reduces quantity of waste to disposal			√			Retain on basis that the component results in decreased waste generation (due to reduced packaging waste)
1.18	Promote reuse (refillable packages, reuse centres)	in GTA at this time	re-use activities reduce waste going to disposal - uncertain of the extent to which promotion impacts reuse	N/A	likely to reduce quantity to disposal by encouraging reuse		√				Retain on basis that increased reuse leads to decreased use of disposable packages and products, thereby reducing the waste stream
1.19	Deposit/refund systems for a variety of materials	in place for some materials (beer bottles)	proven	N/A	reduces quantity of waste disposed			√			Retain on basis that deposit/refund systems contribute to increased recovery of materials. Provincial legislation required for implementation
1.20	Hold community source reduction workshops	not in place in GTA	proven at pilot scale (e.g. Maxville Kenyon)	N/A	likely to reduce quantity of waste disposed (amount not easily quantified)		√				Retain on basis that the component encourages source reduction behaviour
1.21	Develop "pre-cycling" campaign	not in place as major programs	impacts not proven quantitatively, likely to cause change in behaviour over time	N/A	likely to reduce quantity of waste disposed over time		√				Retain on basis that educating consumers results in improved source reduction behaviour and decreased waste generation
1.22	Develop award system to recognize waste reduction achievements	in place in GTA	proven (e.g. RCO awards)	N/A	likely to reduce quantity of waste disposed indirectly		√				Retain on basis that the component currently exists and contributes to waste reduction
1.23	Organize SWAP days or neighbourhood garage sales	exists to limited extent in GTA	proven	N/A	minor impact on quantity of waste disposed		√				Retain on basis that the component currently exists and results in decreased waste generation
1.24	Develop infrastructure for distribution of high quality food from catering facilities (e.g. Second Harvest)	in place through efforts of Second Harvest	proven	may be some limitations due to liability and public health concerns	reduces quantity of waste disposed			√			Retain on basis that the component currently exists and provides best end use of food waste, and diverts waste from disposal
1.25	Use food waste as animal feed	in place and used by GTA generators	proven	Ministry of Agriculture limitations on approach for some livestock	reduces quantity of waste disposed		√				Retain on basis that the component currently exists and successfully reduces the amount of food waste disposed and results in valuable secondary use of the food

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
1.26	Landspread food waste	in place and used by GTA generators				proven	reviewed on a case by case basis by MOEE	reduces quantity of waste disposed		√				Retain on basis that the component currently exists and food waste is diverted to a useful purpose
1.27	Restrict advertising to airwaves (to minimize paper production)	not in place in GTA				unproven	unlikely that this can be implemented	if implemented, would reduce paper waste significantly					√	Although this may result in waste diversion, the component has not been proven and may constitute unfair business practices. Screen on basis of unproven technique
1.28	Provide neighbourhood leaf shredders in fall	not in GTA				assume proven	N/A	would reduce quantity of disposal if leaves put to alternative uses			√			Retain on basis that the component may encourage increased diversion of leaf waste
2.0	**Residential Recycling and Collection**													
2.1	Curbside collection of Blue Box materials	Y	Y	Y	Y	proven	required in MOEE 3Rs regulations	reduces quantity of waste disposed	√					Retain on basis that the component currently exists in GTA (and elsewhere) and has contributed to waste diversion
2.2	Curbside collection of Expanded Blue Box materials (ONP, OCC, boxboard, PET, HDPE, film and other plastics, glass, aluminum, tinplate steel, mixed paper, fine paper, textiles)	N	Y	N	N	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that the component currently exists in GTA and has contributed to waste diversion
2.3	Collection of all dry waste in a 2-stream wet-dry system	N	N	N	N	proven	conflicts with government policy	reduces quantity of waste disposed					√	While the component may contribute to waste diversion, this component conflicts with government policy
2.4	Collection of all dry recyclables and waste in a 3-stream wet-dry system	N	N	N	N	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that the component has proven successful in diverting waste
2.5	Collection of all dry recyclables in a 4-stream wet-dry system	N	N	N	N	proven	N/A	reduces quantity of waste disposed			√			Retain as immediate secondary enhancement, potential variation of 3-stream system design, contributes to waste diversion
2.6	Collection of recyclables at all multi-family dwellings	N	N	N	N	proven	N/A	reduces quantity of waste disposed			√			Retain as valuable element in providing comprehensive waste diversion services to householders in GTA

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
2.7	Recycling services to all rural households in GTA (depot, curbside)	N	N	N	N	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component would increase diversion
2.8	Drop-off depot system for dry recyclables and other (e.g. bulky) materials	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component would provide increased opportunities for diversion
2.9	Collection of dry recyclables in a mixed waste collection system	N	N	N	N	limited success	conflicts with MOEE 3Rs regulations	reduces quantity of waste disposed					√	Screen on basis that component conflicts with government policy for source separation
2.10	Curbside collection of wet household kitchen waste	N	N	N	N	proven at pilot scale	N/A	reduces quantity of waste disposed		√				Retain on basis that the component contributes to diversion of wet wastes not handled by existing recycling systems
2.11	Curbside collection of household organics in a 2-stream wet/dry collection system	N	N	N	N	proven at pilot scale	conflicts with government policy	reduces quantity of waste disposed					√	Screen on basis that a 2-stream collection system conflicts with government policy
2.12	Curbside collection of household organics in a 3-stream wet/dry collection system	N	N	N	N	proven at pilot scale	N/A	reduces quantity of waste disposed	√					Retain on basis that the component contributes to increased waste diversion
2.13	Curbside collection of household organics in a 4-stream wet/dry collection system	N	N	N	N	proven at pilot scale	N/A	reduces quantity of waste disposed			√			Retain as immediate secondary enhancement, variation of 3-stream system design
2.14	Special/separate collections at curbside	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunities to divert waste conveniently
2.15	Collection of dry recyclables from multi-family buildings containing 6 or more units	Y	Y	Y	Y	proven	required by 3Rs Regulations	reduces quantity of waste disposed		√				Retain on basis that the component contributes to increased waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
2.16	Collection of 3rd bag of waste (garbage remaining after source separation of dry recyclables and leaf and yard waste) for further processing	N	N	N	N	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that the component contributes to increased capture and diversion of recyclable materials, and composting of remaining mixed waste stream resulting in decreased waste disposal
3.0 Residential Leaf and Yard Waste Collection														
3.1	Seasonal curbside collection of leaf and yard waste	Y	Y	Y	Y	proven	meets requirements of 3Rs Regulations	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunities to divert leaf and yard waste conveniently, and composting of remaining mixed waste stream
3.2	Drop-off depots for leaf and yard wastes	Y	Y	Y	Y	proven	meets requirements of 3Rs Regulations	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunities to divert leaf and yard waste and reduces waste disposed
4.0 Residential Household Composting														
4.1	Distribution/provision of backyard composters for backyard composting by single family residents	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunities to divert residential organics resulting in increased waste diversion
4.2	Backyard composting (large 3-bin units) for multi-family residents	N	N	Y	N	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunity to divert residential organics from multi-family units resulting in increased waste diversion
4.3	Vermicomposting by multi-family residents	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides opportunity to divert residential organics from multi-family units resulting in increased waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
									Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal			Immediate	Long Term		
5.0	**Other Residential Waste Diversion**													
5.1	Household hazardous waste (including mobile HHW depots)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		✓				Retain on basis that the component provides an opportunity to divert an additional element of the waste stream resulting in increased waste diversion
5.2	Toxic taxi	N	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		✓				Retain on basis that the component provides a convenient opportunity to divert an additional element of the waste stream resulting in increased waste diversion
5.3	White goods collection and drop-off	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		✓				Retain on basis that the component provides an opportunity to divert additional elements of the waste stream resulting in increased waste diversion
5.4	Special/separate collections at curbside for bulky waste (white goods, furniture, Christmas trees, etc)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		✓				Retain on basis that the component provides a convenient opportunity to divert additional elements of the waste stream resulting in increased waste diversion
6.0	**Composting/Anaerobic Digestion Facilities**													
6.1	Centralized windrow composting of source separated household organics (food, leaf and yard, etc.)	N	N	N	N	proven	N/A	reduces quantity of waste disposed			✓			Retain as secondary immediate component on basis that the component results in increased waste diversion but may experience odour problems
6.2	Centralized windrow composting of third bag mixed waste remaining after source separation of Blue Box materials and leaf and yard waste	N	N	N	N	proven	compost quality may not meet MOEE requirements for unrestricted use. Restricted use may or may not be feasible	reduces quantity of waste disposed			✓			Retain as secondary immediate component on basis that the component results in increased waste diversion but may experience odour problems
6.3	Centralized windrow composting of mixed waste	N	N	N	N	proven	conflicts with MOEE 3Rs regulations on source separation	reduces quantity of waste disposed					✓	Screen on basis that component conflicts with MOEE 3Rs Regulations

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
											Immediate	Long Term		
6.4	Centralized in-vessel composting of source separated organics	N	N	Y	N	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that the component is an appropriate processing technology for household organics collected in a 3-stream collection system
6.5	Centralized in-vessel composting of mixed waste (third bag)	N	N	N	N	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that the component is a required processing technology for third bag, to increase diversion
6.6	Centralized in-vessel composting of mixed waste	N	N	N	N	proven	conflicts with MOEE 3Rs regulations on source separation	reduces quantity of waste disposed					√	Although this technology may result in waste diversion, screen on basis of conflict with MOEE 3Rs Regulations
6.7	Community composting/gardening projects	in GTA				proven	compost can be used locally	reduces quantity of waste disposed		√				Retain on basis that the component contributes to increased awareness of composting and results in waste diversion
6.8	Centralized windrow composting of leaf and yard waste	in GTA				proven	compost can be used locally	reduces quantity of waste disposed	√					Retain as core component on basis that the component processes diverted leaf and yard waste
6.9	Use centralized anaerobic digesters	N	N	N	N	proven in Europe	N/A	reduces quantity of waste disposed			√			Retain as secondary immediate component as potential substitute for aerobic composting
7.0 Reuse Centres														
7.1	Social Service Centres (i.e. Goodwill)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on the basis that components exist and contribute to waste reduction through reuse
8.0 Processing														
8.1	Processing of source separated or commingled dry recyclables in material recovery facility (MRF) (improved or expanded as required)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed	√					Retain as a core component as the component is proven technology for processing of dry recyclables
8.2	Processing of mixed (non source-separated) wet and dry waste in a Mixed Waste Processing and Composting Facility	N	N	N	N	proven	conflicts with 3Rs regulations which require source separation	reduces quantity of waste disposed					√	Screen on basis of conflict with government policy

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
											Immediate	Long Term		
8.3	Processing third bag waste in a Mixed Waste Processing and Composting Facility	N	N	N	N	proven	N/A	reduces quantity of waste disposed	√					Retain as core component which is required for processing of "third bag" of waste
8.4	Processing of single material streams (e.g. wood, tires etc) in custom designed facilities	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain as processing component that contributes to waste diversion
8.5	Replace collection and processing equipment and approach with world-wide state-of-the-art technology (from Japan, Germany, etc.)	GTA systems use state-of-the-art technology when upgrading				being proven on an on-going basis	N/A	some techniques will increase waste diversion				√		Retain as secondary long-term component on basis that new technologies may be developed to increase waste diversion
8.6	Use sophisticated sorting facilities which feed pyrolysis or gasification plants	does not exist in GTA				proven	conflicts with government policy in some cases	reduces quantity of waste disposed					√	Screen on basis that incineration is contrary to provincial legislation
9.0 Residential Recycling Depots/Transfer Stations														
9.1	Provide adequate depots for all neighbourhoods in GTA to complement existing Blue Box system (located at transfer stations, landfill sites, etc.)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides an increased opportunity for waste diversion
9.2	Drop-off depot system for dry recyclables and other (e.g. bulky) materials	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides an increased opportunity for waste diversion
9.3	Drop-off depots for all household organics (food, other wet wastes and garden wastes)	N	N	N	N	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that the component provides an increased opportunity for organic waste diversion
10.0 Residential Regulation														
10.1	Develop requirement that all waste received at landfill must be from designated processing facilities (no unprocessed waste to landfill)	N	N	N	N	proven	N/A	reduces quantity of waste disposed			√			Retain as secondary immediate enhancement as potential method of increasing residential waste diversion
10.2	Mandatory source separation (3Rs) by residential sector	exists in Halton				proven	N/A	strategy increases waste diversion			√			Retain as potential method of increasing participation in source separation programs

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
10.3	Landfill bans on a variety of materials	Y	Y	Y	Y	proven in GTA	N/A	reduces quantity for disposal		√				Retain on basis that the component encourages increased recycling and therefore contributes to waste diversion
10.4	Flow control (delivery of residential waste to designated facilities)	does not exist in GTA				implementation being overturned in U.S.	conflicts with government policy	does not necessarily reduce quantity					√	Screen on basis of conflict with government policy
10.5	Require municipalities in GTA to achieve designated diversion targets	not currently enforced at municipal level				proven	N/A	may assist in reducing quantity			√			Retain as immediate secondary component on basis that mandatory targets increase diversion
10.6	Require municipalities in GTA to establish effective waste generation and diversion monitoring systems	in place for residential but not IC&I sector				proven	N/A	may assist in reducing quantity of waste disposed			√			Retain as immediate secondary component on basis that good feedback increases system performance
10.7	Ban non-recyclable packaging products	not currently enforced at municipal level				effects not proven or quantified	N/A	may assist in reducing quantity of waste disposed					√	Screen on basis of unproven results of policy
10.8	Change compost quality standards to allow more widespread use of compost	provincial jurisdiction				unproven	inconsistent with stated government policy	strategy likely to reduce quantity of waste requiring landfill					√	Screen on basis of inconsistency with government policy
11.0 Residential Programs														
11.1	Reduce garbage collection frequency	Y	Y	Y	Y	proven	N/A	likely decreases quantity of waste disposed		√				Retain on basis that the component currently exists and is likely to increase waste diversion
11.2	Set-out limit (bag limit) for garbage collection	N	N	N	Y	proven	N/A	likely decreases quantity of waste disposed		√				Retain on basis that the component currently exists and may increase waste diversion
11.3	Reduce frequency of recyclables collection	Y	N	Y	N	proven	frequency at half of garbage collection frequency meets 3Rs Regulations	does not increase waste diversion					√	Screen on basis of failure to reduce waste requiring final disposal
11.4	Allow residences to refuse delivery of unwanted "junk mail"	on voluntary basis in GTA				not quantified	N/A	may reduce disposal			√			Retain on basis of potential source reduction of junk mail
11.5	Reject loads with visible designated materials	Y	Y	Y	Y	proven	N/A	would reduce disposed waste			√			Retain on basis that the component reduces disposal of recyclable materials

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
											Immediate	Long Term		
11.6	Develop landfill management practices which utilize disposed waste as cover material	N	N	N	N	proven	N/A	strategy preserves landfill capacity			√			Retain on basis that component "reuses" waste materials as a resource
11.7	Produce compost on-site for landfill cover and preserve capacity	N	N	N	N	proven	N/A	strategy preserves landfill capacity			√			Retain on basis that component displaces borrow material as daily cover in landfill
11.8	Volume based disposal fees	N	N	N	N	proven	N/A	may reduce quantities received			√			Retain on basis that the component encourages increased diversion of low density materials
11.9	Disposal surcharges on some items (e.g. tires, white goods etc)	Y	Y	Y	Y	proven	N/A	may reduce quantities received		√				Retain on basis that component exists and provides an economic incentive to increased waste diversion
11.10	Landfill mining to recover materials	N	N	N	N	proven	N/A	strategy preserves landfill capacity but does not directly reduce quantity of waste requiring disposal					√	Screen on basis that the component does not meet third criterion; however strategy is of value to preserve landfill capacity
11.11	Establish scavenging centres at all landfills	N	N	N	N	proven	may contravene local by-laws	quantity of recoverable material may be small but component considered of value					√	Screen on basis of potential conflict with local by-laws; local by-laws that prevent scavenging should be reviewed, as scavenging provides opportunity for some increased waste diversion
11.12	Differential tipping fees based on degree of processing or waste composition	Y	Y	Y	Y	proven	N/A	strategy encourages processing and increases quantity diverted		√				Retain on basis that component exists and contributes to waste diversion
12.0 Residential Promotion/Education														
12.1	Strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc.)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed, but difficult to measure extent			√			Retain on basis that component encourages participation leading to increased waste diversion (now and in the future)

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
12.2	Develop strong consumer education program to encourage bulk buying, refuse excess packaging, promote re-use, buy recycled, promote refillable containers etc.	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed, but difficult to measure extent		√				Retain on basis that component exists and contributes to source reduction and waste diversion
12.3	Develop strong homeowner education program to focus on pre-cycling, backyard composting, grass-cycling, Direct Cost, Expanded Blue Box, Wet/Dry, reuse, etc.	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed, but difficult to measure extent		√				Retain on basis that component contributes to behaviour change and increased waste diversion
12.4	Support community based educational program such as neighbourhood composting (e.g. Port Colborne)	Y	Y	Y	Y	proven	N/A	reduces quantity of waste disposed, but difficult to measure extent		√				Retain on basis that component encourages community activity, increases interest, awareness and participation in waste diversion activities
13.0 Residential Economic Incentives														
13.1	Direct Cost system for garbage collection at curbside (fixed per bag rate, variable rate, weight based, etc.)	Direct Cost not in place at this time				proven	N/A	reduces quantity of waste disposed	√					Retain on basis that component provides visible economic incentive to increased waste diversion
13.2	Financial incentives to purchase durable products	not in place				unproven	N/A	difficult to design and administer programs to achieve waste reduction. Difficult to monitor waste reduction that is achieved due to these policies specifically.					√	Screen on basis that strategy is unproven because ability of this type of policy to achieve waste reduction is not known and if implemented it would be difficult to monitor results achieved
13.3	Grant programs to support source reduction in residential sector	in place				proven, but hard to measure	N/A	assumed to reduce quantity of waste disposed			√			Retain on basis of assumed waste diversion potential
13.4	Full cost accounting forcing municipalities to charge the full or total cost of waste management	landfill charges in GTA reflect total cost				proven	N/A	reduces quantity of waste disposed			√			Retain on basis that charging full costs of waste management would provide increased incentive to waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
							Enhancement				
								Secondary			
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
14.0 Residential Market Development Policies											
14.1	Integrate waste diversion with economic development programs to create markets for secondary materials	not in place	under consideration in many jurisdictions	N/A	over long-term, policy would stimulate secondary materials markets locally				√		Retain as long term secondary component on basis that component appears to have potential to reduce waste, although specific impact on GTA waste diversion is uncertain
14.2	Mandate product stewardship with requirement for market development	not in place	proven in Germany that packaging stewardship program needs market development component	consistent with government policy	increases recovery thereby reduces quantity of waste to disposal			√			Retain on basis that component reduces waste to final disposal
IC&I											
15.0 IC&I Hauling, Recycling and Storage											
15.1	Expand Blue Box system to cover all IC&I facilities that want to participate, with focus on institutional and commercial	N Y Y N	proven	N/A	reduces quantity of waste disposed			√			Retain on basis that component would provide increase diversion by providing increased opportunities to recycle
15.2	Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.)	not provided in comprehensive manner	proven	N/A	likely to decrease quantity of waste disposed			√			Retain on basis that recovery would increase through convenient opportunities to recycle
15.3	Collection of source separated dry recyclables	in place	proven	N/A	likely to decrease quantity of waste disposed	√					Retain on basis that component exists and contributes to waste diversion
15.4	Collection of commingled dry recyclables from IC&I sector	in place	proven	N/A	likely to decrease quantity of waste disposed	√					Retain on basis that component exists and contributes to waste diversion
15.5	Collection of source separated organics from IC&I sector	in place	proven	N/A	likely to decrease quantity of waste disposed	√					Retain on basis that component exists and contributes to waste diversion
15.6	Collection of mixed waste from IC&I sector	in place	proven	N/A	reduces quantity disposed if subsequently processed and marketed		√				Retain on basis that component currently exists. If material is processed, contributes to waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
							Enhancement				
								Secondary			
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
15.7	Long term storage of dry IC&I recyclables until recycling technologies developed and/or profitable/stable markets developed	does not exist in GTA	unproven	no apparent conflict with government policy	impact on diversion uncertain					√	Screen on basis of unproven technology. Long term storage requirements would be significant, with uncertainty regarding future markets and processing technologies for some materials
15.8	Short term (3 to 6 month) storage of IC&I dry materials to take advantage of emerging recycling technologies and/or market prices	likely to exist informally in GTA	N/A	no apparent conflict with government policy	could reduce quantity of waste disposed			√			Assuming stringent storage conditions met, may ensure successful diversion of large quantities of materials
16.0 IC&I Composting											
16.1	On-site composting of IC&I organics (vermicomposters and other by restaurants, schools, grocery stores, etc.)	exists at some GTA facilities	proven	meeting health regulations may be difficult for many generators	reduces quantity of waste disposed		√				Retain on basis that component diverts waste
16.2	Centralized windrow composting of source separated organics	exists in GTA	proven, some intermittent odour problems	in some cases, odour problems occur, compost quality fails to meet MOEE guidelines for unrestricted use	reduces quantity of waste disposed		√				Retain on basis that component diverts organics subject to maintenance of process quality control
16.3	Centralized in-vessel composting of source separated organics	N N Y N	proven	compost quality may present limitations for end uses	reduces quantity of waste disposed		√				Retain on basis that component diverts organics subject to maintenance of process quality control
16.4	Centralized composting of leaf and yard waste	exists in GTA	proven	compost quality may present limitations for end uses	reduces quantity of waste disposed		√				Retain on basis that component diverts organics subject to maintenance of process quality control
16.5	Use centralized anaerobic digesters	does not exist in GTA	proven	no apparent conflict with government policy	reduces quantity of waste disposed			√			Retain as immediate secondary component as a technical option to aerobic composting for diversion of IC&I organics
16.6	Centralized in-vessel composting of mixed IC&I waste	does not exist in GTA	unproven; generally not applicable to IC&I waste as 93% is dry	conflicts with MOEE 3Rs regulations	slight quantity reduction					√	Screen on basis of unproven technology and conflict with MOEE 3Rs Regulations

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions (Durham Peel Metro York)	Screening Criteria: Unproven Technology or Techniques	Screening Criteria: Strategy Fails to Satisfy Government Regulations and Standards	Screening Criteria: Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Screening Conclusion: Core	Screening Conclusion: Enhancement: Primary	Screening Conclusion: Enhancement: Secondary: Immediate	Screening Conclusion: Enhancement: Secondary: Long Term	Screening Conclusion: Screened Out	Rationale
17.0 IC&I Reuse											
17.1	Ontario Waste Exchange	used by GTA generators	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that component exists and has proven effective in waste diversion through reuse
18.0 IC&I Recycling Depots/Transfer Stations											
18.1	Provide adequate depots and transfer stations to be used by small IC&I generators, to compliment existing Blue Box system	used by GTA generators	proven	N/A	reduces quantity of waste disposed		√				Retain depots on basis that component provides increased opportunities to recycle
19.0 MRFs/Processing for IC&I Sector											
19.1	Processing of source separated or commingled dry recyclables in a material recovery facility (MRF)	in GTA	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that component exists, and is an essential element of existing successful waste diversion programs
19.2	Processing of mixed IC&I waste in a Mixed Waste Processing facility	not in GTA	proven	does not conflict with government policy assuming IC&I generators meet source separation requirements of MOEE 3Rs Regulations	reduces quantity of waste disposed	√					Retain on basis that component contributes to increased diversion of (predominantly dry) IC&I waste
19.3	Processing of single material streams (e.g. tire processing facility wood, tires, etc.) in custom designed facilities	in GTA	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that component exists and contributes to waste diversion
19.4	Construction/demolition waste processing at specialized salvaging operations	in GTA	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that component exists and contributes to waste diversion
19.5	Replace processing equipment and approach with state-of-the-art technology world wide (from Japan, Germany, etc.) as required	has occurred as required	only proven technologies should be used	assess on case-by-case basis	likely to contribute to increased waste diversion because of increased efficiency			√			Retain on basis that this approach contributes to increased waste diversion through increased process efficiencies
19.6	Food waste diversion through rendering, landspreading, hog farming, etc.	exists in GTA	proven	N/A	reduces quantity of waste disposed		√				Retain on basis that component exists and contributes to food waste diversion

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
							Enhancement				
								Secondary			
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
20.0 IC&I Regulation											
20.1	Develop requirement that all waste received at landfill must be from designated processing facilities (no unprocessed waste to landfill)	proven	proven	N/A	would reduce quantity to landfill by encouraging diversion of processed waste	√					Retain on basis that component is an effective method of ensuring consideration of waste diversion by IC&I sector
20.2	Mandatory source separation of various IC&I recyclables (MOEE 3Rs Regulations as basis) by expanding list of IC&I generators	committed system includes this requirement for some generators	proven	N/A	reduces quantity of waste disposed	√					Retain on basis that component exists and contributes to IC&I waste diversion
20.3	Landfill bans on a variety of materials	in place in GTA	proven	N/A	reduces quantity disposed at GTA landfills		√				Retain on basis that component exists and contributes to IC&I waste diversion
20.4	Ban non-recyclable packaging and products	not in place in GTA	unproven	more effective if implemented at provincial or federal level	impacts on disposed waste quantities not known (may increase)					√	Screen on basis of uncertain and unproven waste diversion impacts
20.5	Require retailers and/or producers to establish recovery systems for designated products and packaging	not in place in GTA	this approach used in Germany (German Green Dot) France (Eco-Emballage), Belgium (FOST), U.K., and under consideration in Canada (CIPSI)	N/A	likely to reduce quantity going to landfill by increasing recycling opportunities			√			Retain on basis that component contributes to IC&I waste diversion
20.6	Deposit/refund system for soft drink containers	not in place in GTA	proven	N/A	reduces quantity to landfill			√			Retain on basis that component is likely to increase recovery of specified materials and contribute to waste diversion
20.7	Deposit/refund system for all beverage containers (liquor, juice, milk, water, etc.)	not in place in GTA	this system being considered (but not yet fully implemented) by a number of jurisdictions; unproven	N/A	reduces quantity to landfill					√	Screen on basis of unproven policy
20.8	Mandatory recovery rates and targets for specific materials	does not exist at this time	proven	N/A	reduces quantity of waste disposed			√			Retain on basis that component is likely to increase waste diversion through increased recovery

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions: Durham Peel Metro York	Screening Criteria: Unproven Technology or Techniques	Screening Criteria: Strategy Fails to Satisfy Government Regulations and Standards	Screening Criteria: Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Screening Conclusion: Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
20.9	Change current health and safety regulations to allow more uses for food waste, and limit liability to encourage greater participation in food waste diversion by IC&I sector	does not exist at this time	not proven but appears to have potential	potential conflict with government policy	may increase food waste diversion and decrease quantity being disposed					√	Screen on basis that component requires amendments to existing legislation and likely conflicts with stated government regulations and standards
20.10	Change health and safety thresholds for use of secondary materials in food contact packaging or other products	under discussion provincially and federally at this time	impacts unproven, assumed to increase demand for recycled boxboard; under consideration by FDA (U.S.)	changes required to federal and provincial packaging standards; conflicts with government policy	impacts uncertain; assumed to increase demand for boxboard with recycled content, increasing market demand for fibres and therefore stimulate recycling					√	Screen on basis that component fails to meet current government policy and regulations
20.11	Change compost quality standards to allow more widespread use of compost	does not exist in GTA	impacts unproven	conflicts with current government standards	strategy could significantly reduce quantity to landfill by providing more opportunities for use of compost					√	Screen on basis that component conflicts with current government standards
20.12	Adopt product labelling system which promotes 3Rs	not in place; is currently implemented on voluntary basis	proven	N/A	impacts unproven					√	Screen on basis of unproven impact on waste diversion
20.13	Minimum secondary material content for packaging and products	is currently implemented on voluntary basis	unproven	N/A	impact unproven					√	May stimulate markets for secondary materials however screen on basis of unproven impacts on waste diversion
20.14	Tax industries creating excess garbage and packaging	does not exist in GTA	unproven	N/A	impact unproven					√	Screen on basis of unproven impacts on waste diversion
20.15	Eliminate economic subsidies to industry	not in place in GTA	unproven	N/A	impact unproven					√	Screen on basis of unproven policy
20.16	Mandated levies or taxes to support 3Rs	not in place in GTA	proven	N/A	likely to increase diversion through increased financial support of 3Rs programs			√			Retain on basis that component is likely to contribute to waste diversion through increased financial support of 3Rs programs
20.17	Pass legislation against over-packaging	addressed on voluntary basis through NAPP	unproven	N/A	impact uncertain					√	Screen on basis of unproven policy
20.18	Ban use of polystyrene and similar products	does not exist in GTA	unproven	N/A	impact on waste diversion uncertain					√	Screen on basis of unproven policy; bans have been implemented but may result in increased waste generation (e.g. paper waste vs. polystyrene waste)

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
							Enhancement				
								Secondary			
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
20.19	Tax on virgin materials to develop markets for secondary materials	not in place	unproven at this time	may contravene GATT, NAFTA, and be considered a trade barrier	impacts non-specific and unknown					√	Screen on basis of unproven policy which may not meet policy and regulations
20.20	Mandatory waste audits for IC&I generators	carried out on voluntary basis in GTA	proven to reduce waste quantities in some cases	N/A	reduces quantity of waste disposed, by making generators more aware of waste generation practices		√				Retain on basis that component is an essential tool for IC&I waste diversion planning, leading to increased IC&I waste diversion
20.21	Flow control (delivery of IC&I waste to designated facilities)	does not exist in GTA	implementation being overturned in US	conflicts with government policy	does not necessarily reduce quantity of waste disposed					√	Screen on basis of conflict with government policy
21.0 IC&I Programs											
21.1	Change approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval	in place in some GTA Regions	proven	N/A	likely to contribute to waste diversion in long-term			√			Retain on basis that the component encourages consideration of waste diversion in facility planning which will lead to waste diversion
21.2	Establishment of central food waste management organization to help food retailers to send excess food to food banks, or to animal feed if human consumption not viable	elements in place	not proven, but likely to be successful	there may be health and liability concerns which limit approach	if successful, waste to disposal would be reduced				√		Retain as long term secondary component on basis that if successful, would likely result in increased diversion of food waste
21.3	Allow locations to refuse delivery of unwanted "junk mail"	being practiced in GTA	proven	N/A	reduces quantity of waste disposed				√		Retain on basis of potential source reduction of junk mail
21.4	Develop and implement a material use guideline	in progress by MOEE	proven	N/A	likely to reduce quantity of waste disposed			√			Retain on basis that component provides options for beneficial use of materials that might otherwise be disposed. Content of guidelines will determine options for material management and impact on waste diversion
22.0 IC&I Promotion/Education											
22.1	Strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc)	education programs provided at some educational institutions in GTA	proven	N/A	likely to reduce quantity of waste disposed, particularly over long term			√			Retain on basis that component increases participation in existing waste diversion programs and will result in long term benefits (of consumer education)

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
							Enhancement				
								Secondary			
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
22.2	Develop IC&I generator education program	all GTA Regions provide IC&I education programs	proven	N/A	likely to reduce waste over long-term		✓				Retain on basis that component provides information on waste diversion and likely contributes to increased waste diversion achievements by generators
22.3	Develop environmental design program at schools and colleges	exists in GTA	proven	N/A	not proven that component directly reduces quantity disposed					✓	Screen component on basis of unproven impacts on waste diversion
22.4	Establish databank on waste reduction technologies and system design	exists in GTA (RCO, and other sources)	proven	N/A	may indirectly reduce quantity disposed			✓			Retain on basis that easy accessibility of data supports waste diversion
23.0 IC&I Economic Incentives											
23.1	Financial incentives to purchase durable products	not in place	unproven	N/A	likely to have minor impacts over long-term					✓	Screen on basis that component is not proven; will probably have minor impacts and may be administratively cumbersome
23.2	Grant programs to support source reduction	not in place	proven	N/A	likely to have impacts over time			✓			Retain on basis that component encourages increased source reduction activities leading to waste diversion
23.3	Economic incentives to encourage product re-design for durability, recyclability and refillability	not in place	unproven	N/A	likely to have impacts on waste diversion over long-term					✓	Screen on basis that component is not proven; will probably have minor impacts and may be administratively cumbersome
23.4	Self-imposed levies by producers to support 3Rs	under development in Ontario (CIPSI)	proven (German Green Dot)	N/A	would reduce quantity of waste disposed			✓			Retain on basis that component contributes to waste diversion by providing financial support to recycling activities
23.5	Advanced disposal fee for larger wastes and special categories of waste	not in place in GTA	proven (Florida)	N/A	impacts unknown					✓	Screen on basis that impacts are unknown
24.0 IC&I Market Development Policies											
24.1	Funding and incentives to recycling industries or other industries that utilize secondary materials	funded through MOEE	proven	N/A	direct impact on waste diversion likely to be positive			✓			Retain on basis that component encourages development of markets for secondary materials
24.2	Funding incentives to product manufacturers to utilize secondary materials	exists to some extent	proven	N/A	diversion impacts not measured				✓		Retain on basis that component supports development of markets for secondary materials

TABLE 6.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
24.3	Provide manufacturer tax credits to end users of secondary materials	not in place at this time	unproven	N/A	impacts unknown					√	Screen on basis that component is unproven and impacts are unknown
24.4	Tax exemptions on recycling equipment	not in place at this time	unproven	N/A	may stimulate local recycling industry, but impacts on disposed quantities are uncertain					√	Screen on basis that component impacts are unknown and policy is unproven
24.5	Exempt recycled products from sales tax	not in place at in GTA	unproven, but assume that it stimulates sales of recycled products	N/A	not known if this would impact on diversion from GTA landfills (impacts not localized)					√	Screen on basis that impacts are not known (unproven)
24.6	Purchasing specifications to promote recycled content	in place by some private and public sector bodies in GTA (e.g. GIPPER)	proven	N/A	impact on GTA waste cannot be quantified			√			Retain on basis that component stimulates markets for secondary materials and contributes to waste diversion (although at this time, specific impacts on GTA waste are not measured)

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS

Component #	Component Description	Immediate	Long Term	Comments
1.6	Landfill ban on leaf and yard wastes, to force increased management on residential property	√		Leaf and yard waste make up 2%-11% of disposed residential waste and 2% of disposed IC&I waste in the GTA in 1992. A significant portion of this would be diverted through a ban.
1.7	Eliminate pick-up for leaf and yard waste (Oakville has implemented ban on grass pick-up)	√		Leaf and yard waste make up 2% to 11% of the residential waste stream disposed in the GTA in 1992. A significant portion of this would be diverted through a ban.
1.8	Increase use of refillable/reusable packaging and products	√		Should decrease packaging waste by 18% or more for overall reduction of 4.5% of waste stream. (See Schedule A.)
1.9	Landfill bans on recyclable material	√		Assuming existing bans divert many IC&I recyclables, the policy would target residential recyclables. Recyclable materials make up 25% of the residential stream disposed. Assuming 70% of remaining recyclables were diverted through the bans; 17.5% diversion increment of residential stream would be achieved.
1.10	Waste reduction planning requirements for construction/demolition projects	√		Would reduce C&D waste generation by at least 10%, with long term waste diversion benefits.
1.11	Procurement ordinances (favouring durable products, recycled content, and/or reusable purchases)	√		Strengthens markets for secondary materials and reusable containers. Impacts on diversion difficult to quantify.
1.16	Product redesign for increased product life and durability	√		Increased durability would decrease discard rate, thus increasing diversion through source reduction. Measure would apply mostly to durable goods (4-8% of disposed residential waste stream).
1.17	Packaging redesign to reduce quantity and weight	√		Would result in slight decrease in packaging waste (assume 1.5% diversion increment).

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS (continued)

Component #	Component Description	Immediate	Long Term	Comments
1.19	Deposit/refund systems for a variety of materials	√		Ensures high recovery (from 80% to 95% see Schedule B) of materials involved. If applied to all glass, metal and plastic food and beverage containers (8-10% of the residential waste stream), incremental diversion would be 1.6-2% of residential waste stream.
1.24	Develop infrastructure for distribution of high quality food from catering facilities (e.g. Second Harvest)	√		Applicable to IC&I sector food waste. Potential to divert some (assume 10%) of 7% of IC&I sector waste which is food, i.e. 0.7% of the IC&I waste stream, 0.4% diversion of total waste stream.
1.28	Provide neighbourhood leaf shredders in fall	√		If shredders were provided to all neighbourhoods in GTA, would contribute to diversion of 0.2 to 1.4% of residential waste stream (2-11% leaf and yard waste, 25% of which is leaf waste; assume 50% of this fraction.)
2.5	Collection of all dry recyclables in a 4-stream wet-dry system	√		Diversion impacts likely similar to 3-stream (around 60% of residential waste).
2.6	Collection of recyclables at all multi-family dwellings	√		Requirements of 3Rs Regulations will provide recycling service to all residents in multi-family dwellings of over 6 units. Adding the requirement that all multi-family dwellings be serviced would increase diversion by 1-2%, assuming that most multi-family residents will be served.
2.13	Curbside collection of household organics in a 4-stream wet-dry collection system	√		Diversion impacts likely similar to 3-stream (around 60% of residential waste).
6.1	Centralized windrow composting of source separated organics	√		Alternative processing approach for source separated organics. Potential to divert portion of 30% of residential and 9% of IC&I waste stream.

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS (continued)

Component #	Component Description	Immediate	Long Term	Comments
6.2	Centralized windrow composting of mixed waste (third bag)	√		Alternative processing approach for "third bag" of mixed waste. Potential to divert from 33% to 39% of residential waste stream.
6.9	Use centralized anaerobic digesters	√		Alternative processing approach for source separated organics. Could contribute to diversion of some household and IC&I organic wet wastes, which make up 30% of residential waste and 9% of the IC&I waste stream.
8.5	Replace collection and processing equipment and approach with state-of-the-art technology world wide (e.g. Japan, Germany, etc.)		√	Important design approach. Impact on diversion will depend on technique or technology being applied.
10.1	No unprocessed waste to landfill	√		Diversion should increase to over 60% for both residential and IC&I waste (see Chapter 13).
10.2	Mandatory source separation by residential sector	√		Residential diversion should increase by 20%. (Halton experience).
10.5	Require municipalities in GTA to achieve designated diversion targets	√		Diversion would likely increase. Level would depend on a number of factors (see Schedule A).
10.6	Require municipalities in GTA to establish effective waste generation and diversion monitoring systems	√		Information could facilitate design for increased diversion.
11.4	Allow residences to refuse delivery of unwanted "junk mail"	√		Can reduce residential waste by 1.6 to 2.3% assuming reduction of 50%, and generation rate of 15 kg/cap/year.
11.5	Reject loads at landfill or transfer station with visible designated recyclable materials	√		Should encourage increased source separation and diversion.
11.6	Develop landfill management practices which utilize disposed waste as cover material	√		Increases landfill life, all material put to beneficial use could save a proportion of up to 20% of landfill capacity typically occupied by cover material.
11.7	Produce compost on-site for landfill cover to preserve capacity	√		Can divert quantities similar to central composting, and preserve landfill capacity. Suitable use for lower quality compost.

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS (continued)

Component #	Component Description	Immediate	Long Term	Comments
11.8	Volume based disposal fees	√		Provides incentive to decreased disposal. Impacts depend on fees chosen.
12.1	Strong educational programs at all educational institutions (schools, universities, colleges, etc.)	√		Likely to reduce quantity of waste generated through increased awareness of waste management issues.
13.3	Grant programs to support source reduction in residential sector	√		Difficult to measure diversion impacts of this type of program; impacts assumed to be positive. If comprehensive program were implemented GTA wide could reduce residential waste stream by up to 1%.
13.4	Full cost accounting forcing municipalities to charge the full or total cost of waste management	√		Disposal costs of $50-70/tonne charged in GTA are likely close to full cost, therefore the effect of this policy may be minimal. Charging full cost of waste management to residents in Direct Cost System addressed elsewhere. Significantly increases diversion levels (to over 40%).
14.1	Integrate waste diversion with economic development programs to create markets for secondary materials		√	Development of local markets beneficial, by creating stable demand. Difficult to measure diversion impacts of this type of program; impacts assumed to be positive.
14.2	Mandate product stewardship with requirement for market development	√		Could result in recovery of 80% of packaging (25% of residential waste), some of which is currently diverted.
15.1	Expand Blue Box system to cover all IC&I facilities who want to participate, with focus on institutional and commercial	√		Should increase diversion by providing convenient opportunity for IC&I sector to recycle. Impact would depend on level and coverage of service.
15.2	Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.)	√		Would increase diversion by providing additional opportunities to recycle.

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS (continued)

Component #	Component Description	Immediate	Long Term	Comments
15.8	Short term (3 to 6 month) storage of IC&I dry materials to take advantage of emerging technologies and/or market prices	√		Contributes to diversion by providing protection against short term market problems. Impacts depend on materials involved.
16.5	Use centralized anaerobic digesters	√		Alternative processing approach for source separated organics. Can contribute to diversion of 30% of residential waste and 9% of IC&I waste which is organic.
19.5	Replace collection and processing equipment and approach with state-of-the-art technology world wide (e.g. Japan, Germany, etc.)(same as 8.5)	√		Important design approach. Impact on diversion will depend on technique or technology being applied.
20.5	Require retailers and/or producers to establish recovery systems for designated products and packaging	√		Similar to Green Dot approach. Would contribute to diversion of 25% of residential waste.
20.6	Deposit/refund system for soft drink containers	√		Ensures high recovery, diversion of materials involved. If applied to beverage containers (2% of the residential waste stream) incremental diversion would be 0.2% to 0.4% of residential waste stream.
20.8	Mandatory recovery rates and targets for specific materials	√		Increases waste diversion. Rate depends on material.
20.16	Mandated levies or taxes to support 3Rs	√		Provides source of funds to support 3Rs and therefore contributes to diversion. Impacts on waste diversion can be quantified when details of system scoped out.
21.1	Change approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval	√		Will have waste diversion impacts in longer term (impacts can not be quantified until details of policy scoped out).
21.2	Establishment of central food waste management organization to help food retailers to send excess food to food banks, or to animal feed if human consumption not viable		√	Can contribute to diversion of some IC&I food waste (7% of IC&I waste stream). Some portion of this could be diverted for human and animal consumption (% of food waste stream suitable for this purpose is not known).

TABLE 6.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS (continued)

Component #	Component Description	Immediate	Long Term	Comments
21.3	Allow locations to refuse delivery of unwanted "junk mail"		√	Would increase diversion. Percentage of IC&I waste which is junk mail is not known.
21.4	Develop and implement a material use guideline	√		May strengthen markets/ uses for waste materials.
22.1	Strong educational programs at all educational institutions (schools, universities, colleges, etc.)	√		Likely to reduce quantity of waste generated through increased awareness of waste management issues.
22.4	Establish databank on waste reduction technologies and system design	√		Will benefit waste diversion by providing easy access to information. Direct impacts on waste diversion can not be quantified.
23.2	Grant program to support source reduction.	√		Would benefit generators who receive grant, and could possibly help new technologies which source reduce waste. Impacts would depend on grant recipients, and could be estimated on a case-by-case basis.
23.4	Self-imposed levies by producers to promote 3Rs	√		Would contribute to increased diversion. Impact depends on products levied, funds available, and how funds are used.
24.1	Funding and incentives to recycling industries and other industries that utilize secondary materials	√		Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems.
24.2	Funding incentives to product manufacturers to utilize secondary materials		√	Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems.
24.6	Purchasing specifications to promote recycled content	√		Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems.

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
RESIDENTIAL															
1.0	**Reduction and Reuse (Residential and IC&I)**														
1.1	Funding/distribution of source reduction equipment (backyard composters, cloth shopping bags etc.)		√	√	√	√	√	√	√						
1.2	Create waste reduction offices in each Region with the primary objective of promoting reduction and reuse		√	√	√	√	√	√	√						
1.3	Establish community-based (i.e. municipal, non-profit, charitable, etc.) reuse/ repair and goods exchange centres		√	√	√	√	√	√	√						
1.4	Support the efforts of charitable organizations and food reuse organizations		√	√	√	√	√	√	√						
1.5	Promotion of grass-cycling and xeriscaping		√			√	√	√	√						
1.13	Promotion/education for school children focusing on waste reduction		√	√	√	√	√	√	√						
1.14	Economic incentives such as Direct Cost for garbage disposal (see later section on economic incentives)	√				√									
1.15	Promotion/education program for consumers focusing on purchasing habit changes to minimize waste generation (for example bulk buying, borrowing items, buying products in recyclable packaging etc)		√			√	√	√	√						
1.18	Promote reuse (refillable packages, reuse centres)		√			√	√	√	√						
1.20	Hold community source reduction workshops		√			√	√	√	√						
1.21	Develop "pre-cycling" campaign		√			√	√	√	√						
1.22	Develop award system to recognize waste reduction achievements		√	√	√	√	√	√	√						
1.23	Organize SWAP days or neighbourhood garage sales		√	√	√	√	√	√	√						
1.25	Use food waste as animal feed		√	√	√	√	√	√	√	√	√	√	√	√	√
1.26	Landspread food waste		√	√	√	√	√	√	√	√	√	√	√	√	√

* *Residential Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Direct Cost, 4 = Expanded Blue Box, 5 = Wet/Dry, 6 = Mixed Waste Processing*

** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS (continued)

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
2.0 Residential Recycling and Collection															
2.1	Curbside collection of Blue Box materials	√		√	√	√	√	√	√						
2.2	Curbside collection of Expanded Blue Box materials (ONP, OCC, boxboard, PET, HDPE, film and other plastics, glass, aluminum, tinplate steel, mixed paper, fine paper, textiles)	√					√								
2.4	Collection of all dry recyclables and waste in a 3-stream wet-dry system	√						√							
2.7	Recycling services to all rural households in GTA (depot, curbside)		√	√	√	√	√	√	√						
2.8	Drop-off depot system for dry recyclables and other (e.g. bulky) materials		√	√	√	√	√	√	√						
2.10	Curbside collection of wet household kitchen waste		√					√							
2.12	Curbside collection of household organics in a 3- stream wet/dry collection system	√						√							
2.14	Special/separate collections at curbside		√	√	√	√	√	√	√						
2.15	Collection of dry recyclables from multi-family buildings containing 6 or more units		√		√	√	√	√	√						
2.16	Collection of 3rd bag of waste (garbage remaining after source separation of dry recyclables and leaf and yard waste) for further processing	√							√						
3.0 Residential Leaf and Yard Waste Collection															
3.1	Seasonal curbside collection of leaf and yard waste		√	√	√	√	√	√	√						
3.2	Drop-off depots for leaf and yard wastes		√	√	√	√	√	√	√						
4.0 Residential Household Composting															
4.1	Distribution/provision of backyard composters for backyard composting by single family residents		√	√	√	√	√	√	√						
4.2	Backyard composting (large 3-bin units) for multi-family residents		√	√	√	√	√	√	√						
4.3	Vermicomposting by multi-family residents		√	√	√	√	√	√	√						

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** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS (continued)

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
5.0	**Other Residential Waste Diversion**														
5.1	Household hazardous waste (including mobile HHW depots)		√	√	√	√	√	√	√						
5.2	Toxic taxi		√	√	√	√	√	√	√						
5.3	White goods collection and drop-off		√	√	√	√	√	√	√						
5.4	Special/separate collections at curbside for bulky waste (white goods, furniture, Christmas trees, etc)		√	√	√	√	√	√	√						
6.0	**Composting/Anaerobic Digestion Facilities**														
6.4	Centralized in-vessel composting of source separated organics	√						√							
6.5	Centralized in-vessel composting of mixed waste (third bag)	√							√						
6.7	Community composting/gardening projects		√	√	√	√	√	√	√						
6.8	Centralized windrow composting of leaf and yard waste	√		√	√	√	√	√	√						
7.0	**Reuse Centres**														
7.1	Social Service Centres (i.e. Goodwill)		√	√	√	√	√	√	√						
8.0	**Processing of Dry Materials**														
8.1	Processing of source separated or commingled dry recyclables in material recovery facility (MRF) (improved or expanded as required)	√		√	√	√	√	√	√						
8.3	Processing third bag waste in a Mixed Waste Processing and Composting Facility	√							√						
8.4	Processing of single material streams (e.g. wood, tires etc) in custom designed facilities		√	√	√	√	√	√	√						
9.0	**Residential Recycling Depots/Transfer Stations**														
9.1	Provide adequate depots for all neighbourhoods in GTA to complement existing Blue Box system (located at transfer stations, landfill sites, etc.)		√		√	√	√	√	√						
9.2	Drop-off depot system for dry recyclables and other (e.g. bulky) materials		√	√	√	√	√	√	√						

* *Residential Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Direct Cost, 4 = Expanded Blue Box, 5 = Wet/Dry, 6 = Mixed Waste Processing*
** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS (continued)

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
9.3	Drop-off depots for all household organics (food, other wet wastes and garden wastes)		✓					✓							
10.0	**Residential Regulation**														
10.3	Landfill bans on a variety of materials		✓	✓	✓	✓	✓	✓	✓						
11.0	**Residential Programs**														
11.1	Reduce garbage collection frequency		✓	✓	✓	✓	✓	✓	✓						
11.2	Set-out limit (bag limit) for garbage collection		✓	✓											
11.9	Disposal surcharges on some items (e.g. tires, white goods etc)		✓	✓	✓	✓	✓	✓	✓						
11.12	Differential tipping fees based on degree of processing or waste composition		✓	✓	✓	✓	✓	✓	✓						
12.0	**Residential Promotion/Education**														
12.2	Develop strong consumer education program to encourage bulk buying, refuse excess packaging, promote re-use, buy recycled, promote refillable containers etc.		✓			✓	✓	✓	✓						
12.3	Develop strong homeowner education program to focus on pre-cycling, backyard composting, grass-cycling, Direct Cost, Expanded Blue Box, Wet/Dry, reuse, etc.		✓			✓	✓	✓	✓						
12.4	Support community based educational program such as neighbourhood composting (e.g. Port Colborne)		✓			✓	✓	✓	✓						
13.0	**Residential Economic Incentives**														
13.1	Direct Cost system for garbage collection at curbside (fixed per bag rate, variable rate, weight based, etc.)	✓				✓									
IC&I															
15.0	**IC&I Haulage, Recycling and Storage**														
15.3	Collection of source separated dry recyclables	✓								✓	✓	✓	✓	✓	✓
15.4	Collection of commingled dry recyclables from IC&I sector	✓								✓	✓	✓	✓	✓	✓
15.5	Collection of source separated organics from IC&I sector	✓								✓	✓	✓	✓	✓	✓

* *Residential Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Direct Cost, 4 = Expanded Blue Box, 5 = Wet/Dry, 6 = Mixed Waste Processing*

** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS
(continued)

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
15.6	Collection of mixed waste from IC&I sector		√							√	√	√	√	√	√
16.0	**IC&I Composting**														
16.1	On-site composting of IC&I organics (vermicomposters and other by restaurants, schools, grocery stores, etc.)		√							√	√	√	√	√	√
16.2	Centralized windrow composting of source separated organics		√							√	√	√	√	√	√
16.3	Centralized in-vessel composting of source separated organics		√											√	
16.4	Centralized composting of leaf and yard waste		√							√	√	√	√	√	√
17.0	**IC&I Reuse**														
17.1	Ontario Waste Exchange		√							√	√	√	√	√	√
18.0	**IC&I Recycling Depots/Transfer Stations**														
18.1	Provide adequate depots and transfer stations to be used by small IC&I generators, to compliment existing Blue Box system		√								√	√	√	√	√
19.0	**MRFs/Processing for IC&I Sector**														
19.1	Processing of source separated or commingled dry recyclables in a material recovery facility (MRF)	√								√	√	√	√	√	√
19.2	Processing of mixed IC&I waste in a Mixed Waste Processing facility	√													√
19.3	Processing of single material streams (e.g. tire processing facility wood, tires, etc.) in custom designed facilities		√							√	√	√	√	√	√
19.4	Construction/demolition waste processing at specialized salvaging operations		√							√	√	√	√	√	√
19.6	Food waste diversion through rendering, landspreading, hog farming, etc.		√							√	√	√	√	√	√

* *Residential Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Direct Cost, 4 = Expanded Blue Box, 5 = Wet/Dry, 6 = Mixed Waste Processing*
** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.4

INCLUSION OF CORE AND PRIMARY ENHANCEMENT COMPONENTS IN RESIDENTIAL AND IC&I SYSTEMS
(continued)

Component #	Components	COMPONENTS CATEGORY		SYSTEMS IN WHICH COMPONENT INCLUDED											
		Core	Primary Enhancement	Residential*						IC&I**					
				1	2	3	4	5	6	1	2	3	4	5	6
20.0 IC&I Regulation															
20.1	Develop requirement that all waste received at landfill must be from designated processing facilities (no unprocessed waste to landfill)	√													√
20.2	Mandatory source separation of various IC&I recyclables (MOEE 3Rs Regulations as basis) by expanding list of IC&I generators	√										√	√	√	
20.3	Landfill bans on a variety of materials		√							√	√	√	√	√	√
20.20	Mandatory waste audits for IC&I generators		√								√	√	√	√	√
22.0 IC&I Promotion/Education															
22.2	Develop IC&I generator education program		√									√	√	√	√

* *Residential Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Direct Cost, 4 = Expanded Blue Box, 5 = Wet/Dry, 6 = Mixed Waste Processing*
** *IC&I Systems:* *1 = Existing, 2 = Existing/Committed, 3 = Extended 3Rs Regulations, 4 = Expanded 3Rs Regulations, 5 = Expanded 3Rs Regulations with Organics, 6 = No Unprocessed Waste to Landfill*

TABLE 6.5
REGION OF DURHAM
RESIDENTIAL SYSTEM COMPONENTS

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Garbage Collection and Disposal • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • *Direct cost system for garbage collection* • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection** • *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipal forces or contractors to municipalities* • *Collection of residential garbage from multi-family units in three streams by municipal forces or private contractors where feasible* • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Self haul of waste to landfills and transfer stations by residents	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads

TABLE 6.5
REGION OF DURHAM
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling and Collection • Curbside collection of Blue Box materials from single family dwellings. Materials include ONP, OMG, telephone directories, OCC, PET, HDPE, glass, ferrous, aluminum • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations* • *Curbside collection of additional dry materials* • *Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations)* • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • *Curbside collection of increased quantities of dry materials following implementation of Direct Cost system for garbage collection* • Recycling services at all multi-family buildings with 6 or more units • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of Expanded Blue Box materials including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • *Recycling services for full range of Expanded Blue Box materials at all multi-family buildings with 6 or more units* • *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* • *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units*	**Residential Recycling and Collection** • *Provide carts to all single family households* • *Separation of waste into three streams (wet, dry, and garbage) by the householder* • *Expanded set of dry materials to be collected, including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • Recycling services at all multi-family buildings with 6 or more units • *Large bins provided in the garbage management area of multi-family buildings. Residents will be encouraged to separate their waste into three separate bags*	**Residential Recycling and Collection** • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Curbside collection of additional dry materials • Recycling services at all multi-family buildings with 6 or more units • Collection of bins of recyclables from multi-family units

TABLE 6.5
REGION OF DURHAM
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling Depots and Transfer Stations • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators	**Residential Recycling Depots and Transfer Stations** • *Drop-off depots for multi-family residents not serviced by recycling (collecting all Expanded Blue Box materials)* • *Drop-off depot for rural households (collecting all Expanded Blue Box materials)* • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) • Depots located at transfer stations to provide recycling opportunities to self-haul generators
Residential Leaf and Yard Waste Collection • Seasonal curbside collection of leaf and yard waste • Drop-off depots for leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depots for leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depots for leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depots for leaf and yard waste	**Residential Leaf and Yard Waste Collection** • *Collection of leaf and yard waste as part of three stream pick-up* • *Separate brush collection* • Drop-off depots for leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depots for leaf and yard waste
Residential Household Composting • Backyard composter distribution programs (22,450 composters by end of 1992) • Limited community composting • Limited vermicomposting • 4,000 planned (cap budget)	**Residential Household Composting** • Backyard composter distribution programs (26,450 composters by end of 1992) • Limited community composting • Limited vermicomposting	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*

TABLE 6.5
REGION OF DURHAM
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.) • Special curbside collections of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations • Toxic Taxi service (discontinued in Fall 1992)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods , etc.)** • Special curbside collections of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collection of Christmas trees • Permanent drop-off depots for household hazardous waste (HHW) at Brock West Landfill, and Scugog and Oshawa transfer stations
Composting Facilities • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Existing centralized windrow leaf and yard waste composting facilities may be closed • *Central composting facility (in vessel) for composting of source separated household organics (wet stream) and leaf and yard waste*	**Composting Facilities** • Centralized windrow composting of leaf and yard waste • *New mixed waste processing and composting facility*
Reuse Centres and Activities • Goodwill trailers throughout region • Attended donation centre at Riston transfer station	**Reuse Centres and Activities** • Goodwill trailers throughout region • Attended donation centre at Riston transfer station	**Reuse Centres and Activities** • Goodwill trailers throughout region • Attended donation centre at Riston transfer station	**Reuse Centres and Activities** • Goodwill trailers throughout region • Attended donation centre at Riston transfer station	**Reuse Centres and Activities** • Goodwill trailers throughout region • Attended donation centre at Riston transfer station	**Reuse Centres and Activities** • Goodwill trailers throughout region • Attended donation centre at Riston transfer station

TABLE 6.5
REGION OF DURHAM
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	**System 2: Existing/Committed**	**System 3: Direct Cost**	**System 4: Expanded Blue Box**	**System 5: Wet/Dry**	**System 6: Mixed Waste Processing**
MRFs • One processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector. Owned by the municipality and operated by municipal staff • *Construct new MRF to handle 20-year requirements* • *Close existing MRF when new MRF constructed*	**MRFs** • One processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector. Owned by the municipality and operated by municipal staff • Improvements/expansion to the existing regional MRF • *Construct new MRF to handle 20-year requirements* • *Close existing MRF when new MRF constructed*	**MRFs** • One processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector. Owned by the municipality and operated by municipal staff • *Construct new MRF, to process larger stream of dry recyclables* • *Close existing MRF when new MRF constructed*	**MRFs** • One processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector. Owned by the municipality and operated by municipal staff • *Construct new MRF, to process larger stream of dry recyclables* • *Close existing MRF when new MRF constructed*	**MRFs** • Processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector. Owned by the municipality and operated by municipal or contractors' staff • *Construct new MRF, to process larger dry stream of recyclables* • *Close existing MRF when new MRF constructed*	**MRFs** • One processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff • *Construct new MRF to process larger stream of dry recyclables* • *Close existing MRF when new MRF constructed*
Residential Promotion and Education • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc.	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc.	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *3Rs promotion and education program, focused on source reduction, pre-cycling, reuse and recycling* • *Promotion/education program on direct cost system*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *3Rs promotion and education program, focused on source reduction, pre-cycling, reuse and recycling* • *Promotion/education program on Expanded Blue Box program*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *3Rs promotion and education program, focused on source reduction, pre-cycling, reuse and recycling* • *Promotion/education program for wet/dry system*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector, including home composting video • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *3Rs promotion and education program, focused on source reduction, pre-cycling, reuse and recycling*

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Garbage Collection and Disposal • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by municipal forces or private contractors • *Direct cost system for garbage collection from households currently serviced by municipal forces* • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks* • *Collection of residential garbage from multi-family units in three streams by municipal forces or private contractors, where feasible* • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self-haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: **Existing**	**System 2:** **Existing/Committed**	**System 3:** **Direct Cost**	**System 4:** **Expanded Blue Box**	**System 5:** **Wet/Dry**	**System 6:** **Mixed Waste Processing**
Residential Recycling and Collection • Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include ONP, OCC, telephone directories, magazines, PET, HDPE, glass, ferrous, aluminum • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations* • *Curbside collection of additional dry materials* • *Recycling services at all multi-family buildings with 6 or more units (3R's Regulations)* • Collection of bins of recyclables from multi-family units • *Some additional recycling service to multi-family units*	**Residential Recycling and Collection** • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Curbside collection of additional dry materials • Recycling services at all multi-family buildings with 6 or more units • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of Expanded Blue Box materials including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • *Recycling services for full range of Expanded Blue Box materials at all multi-family buildings with 6 or more units* • *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* • *Collection of bins of recyclables (collecting all expanded blue box materials) from multi-family units*	**Residential Recycling and Collection** • *Provide carts to all single family* • *Separation of waste into three streams (wet, dry and garbage) by the householder* • *Expanded set of dry materials to be collected, including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • Recycling services at all multi-family buildings with 6 or more units • *Large bins provided in the garbage management area of multi-family buildings, where space permits. Residents will be encouraged to separate their waste into three separate bags*	**Residential Recycling and Collection** • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Curbside collection of additional dry materials • Recycling services at all multi-family buildings with 6 or more units • Collection of bins of recyclables from multi-family units • Some additional recycling service to multi-family units

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling Depots and Transfer Stations • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Igloos and domes provide opportunities to recycle in public areas • Drop-off depots for multi-family residents not serviced by recycling • Depots for voluntary recycling by residents (e.g.Scarborough)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Igloos and domes provide opportunities to recycle in public areas • Drop-off depots for multi-family residents not serviced by recycling • Depots for voluntary recycling by residents (e.g.Scarborough)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Igloos and domes provide opportunities to recycle in public areas • Drop-off depots for multi-family residents not serviced by recycling • Depots for voluntary recycling by residents (e.g.Scarborough)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators *(collecting all Expanded Blue Box materials)* • Igloos and domes provide opportunities to recycle in public areas • *Drop-off depots for multi-family residents not serviced by recycling, for full range of Expanded Blue Box materials* • Depots for voluntary recycling by residents (e.g.Scarborough)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators *(collecting all Expanded Blue Box materials)* • Igloos and domes provide opportunities to recycle in public areas • Drop-off depots for multi-family residents not serviced by recycling • Depots for voluntary recycling by residents (e.g.Scarborough)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at landfills • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Igloos and domes provide opportunities to recycle in public areas • Drop-off depots for multi-family residents not serviced by recycling • Depots for voluntary recycling by residents (e.g.Scarborough)
Residential Leaf and Yard Waste Collection • Seasonal curbside collection of leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • *New leaf and yard waste bunkers at transfer stations (1994 capital budget)*	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • New leaf and yard waste bunkers at transfer stations (1994 capital budget)	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • New leaf and yard waste bunkers at transfer stations (1994 capital budget)	**Residential Leaf and Yard Waste Collection** • *Collection of leaf and yard waste as part of three stream pick-up* • *Separate brush collection* • New leaf and yard waste bunkers at transfer stations (1994 capital budget)	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • New leaf and yard waste bunkers at transfer stations (1994 capital budget)

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Household Composting • Backyard composter distribution programs (105,000 units to date) • Sale of 3-bin units to some multi-family dwellings at $150 each (25 units by end of 1992) • Limited community composting • Limited vermicomposting	**Residential Household Composting** • Backyard composter distribution programs (105,000 units to date) • *Distribution of an additional 15,000 to 20,000 backyard composters, to bring the total distributed by Metro to between 120,000 and 125,000* • Sale of 3-bin units to some multi-family dwellings at $150 each (25 units by end of 1992) • Additional community composting • Additional vermicomposting	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes on a voluntary basis* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*
Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.) • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods, etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods • Drop-off depots for white goods • Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill.) • Two Toxic Taxis

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Composting Facilities • Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale Site)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale Site)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale Site)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale Site)	**Composting Facilities** • Existing centralized windrow leaf and yard waste composting facilities may be closed • *One new central composting facility (in-vessel) with a capacity to process all household organics and leaf and yard wastes*	**Composting Facilities** • Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale Site) • *Two new mixed waste processing and composting facilities*
Reuse Centres and Activities • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough	**Reuse Centres and Activities** • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough	**Reuse Centres and Activities** • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough	**Reuse Centres and Activities** • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough	**Reuse Centres and Activities** • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.). • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough	**Reuse Centres and Activities** • Goods exchange days • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest) • Re-Uze Centre in Scarborough

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
MRFs • QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation changed in 1993 to process fibres only • CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF (to meet 20 year requirement)*	**MRFs** • QUNO MRF on Commissioners Street, which processes fibres • CRinc MRF on Commissioners Street processes container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc. • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF for processing dry recyclables to meet 20 year requirements*	**MRFs** • QUNO MRF on Commissioners Street, which processes fibres • CRinc MRF on Commissioners Street processes container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc. • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF for processing dry recyclables (to meet 20 year requirement)*	**MRFs** • QUNO MRF on Commissioners Street, which processes fibres • CRinc MRF on Commissioners Street processes container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc. • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF for processing dry recyclables (to meet 20 year requirement)*	**MRFs** • QUNO MRF on Commissioners Street, which processes fibres • CRinc MRF on Commissioners Street processes container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc. • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF for processing dry recyclables (to meet 20 year requirement)*	**MRFs** • QUNO MRF on Commissioners Street, which processes fibres • CRinc MRF on Commissioners Street processes container materials (plastic, metals, and glass). The facility is owned by Metro, and is operated under contract by CRinc. • Dufferin Street MRF is owned by Metro and operated by QUNO • *One new MRF for processing dry recyclables (to meet 20 year requirement)*

TABLE 6.6
METRO TORONTO
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Promotion and Education • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc.	**Residential Promotion and Education** • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc.	**Residential Promotion and Education** • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *Promotion/education on Direct Cost program* • *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	**Residential Promotion and Education** • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *Promotion/education on Expanded Blue Box program* • *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	**Residential Promotion and Education** • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *Promotion/education for Wet/Dry system* • *Promotion/education for source reduction, pre-cycling, composting, reuse, and recycling*	**Residential Promotion and Education** • Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages • Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements etc. • *Promotion/education for source reduction, pre-cycling, composting, reuse and recycling*

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Garbage Collection and Disposal • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection (King City)	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • *Direct cost system for garbage collection* • Collection of residential garbage from multi-family units by private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection	**Garbage Collection** • *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipal forces or contractors to municipalities* • *Collection of residential garbage from multi-family units in three streams by municipal forces or private contractors, where feasible* • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings • Collection of residential garbage from multi-family units by private contractors • Self haul of waste to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads • Limit on number of bags/containers set-out for garbage collection

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: **Existing**	**System 2:** **Existing/Committed**	**System 3:** **Direct Cost**	**System 4:** **Expanded Blue Box**	**System 5:** **Wet/Dry**	**System 6:** **Mixed Waste Processing**
Residential Recycling and Collection • Curbside collection of dry recyclables by municipal forces or private contractors • Materials collected by different municipalities include: ONP, glass, steel, aluminum, PET, OCC, telephone directories, HDPE, rigid and other plastics • Assume collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of dry recyclables by municipal forces or private contractors* • *Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations* • *Curbside collection of additional dry materials* • *Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations)* • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • Curbside collection of dry recyclables by municipal forces or private contractors • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Curbside collection of additional dry materials • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of Expanded Blue Box materials including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • *Recycling services for full range of Expanded Blue Box materials at all multi-family buildings with 6 or more units* • *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units*	**Residential Recycling and Collection** • *Provide carts to all single family households and some "other" households* • *Separation of waste into three streams (wet, dry, and garbage) by the householder* • *Expanded set of dry materials to be collected, including plastics, (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • *Large bins provided in the garbage management area of multi-family buildings if space permits. Residents will be encouraged to separate their waste into three separate bags*	**Residential Recycling and Collection** • Expansion of curbside collection of Blue Box materials from single family dwellings in some municipalities to include all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Curbside collection of additional dry materials • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • Collection of bins of recyclables from multi-family units

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling Depots and Transfer Stations • Assume drop-off depots for multi-family residents not serviced by recycling • Assume drop-off depot for rural households • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	**Residential Recycling Depots and Transfer Stations** • *Drop-off depots for multi-family residents not serviced by recycling* • *Some additional recycling service to multi-family units* • *Some additional recycling at new depots* • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Some additional recycling service to multi-family units • Some additional recycling at new depots • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	**Residential Recycling Depots and Transfer Stations** • *Drop-off depots for multi-family residents not serviced by recycling (collecting all Expanded Blue Box materials)* • *Drop-off depot for rural households (collecting all Expanded Blue Box materials)* • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depot for rural households • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	**Residential Recycling Depots and Transfer Stations** • Drop-off depots for multi-family residents not serviced by recycling • Some additional recycling service to multi-family units • Some additional recycling at new depots • Depot at Markham for boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials
Residential Leaf and Yard Waste Collection • Seasonal curbside collection of leaf and yard waste • Drop-off depot for leaf and yard waste at regions composting site - no charge to residents	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depot for leaf and yard waste at regions composting site - no charge to residents	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depot for leaf and yard waste at regions composting site - no charge to residents	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depot for leaf and yard waste at regions composting site - no charge to residents	**Residential Leaf and Yard Waste Collection** • *Collection of leaf and yard waste as part of three stream pick-up* • *Separate brush collection*	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Drop-off depot for leaf and yard waste at regions composting site - no charge to residents
Residential Household Composting • Backyard composter distribution programs (29,050 composters by end of 1992) • Limited community composting • Limited vermicomposting	**Residential Household Composting** • Backyard composter distribution programs (29,050 composters by end of 1992) • Distribution of additional backyard composters by individual municipalities • Additional community composting • Additional vermicomposting	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.) • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Curbside collection of white goods in all municipalities - frequency varies • Drop-off depots for white goods (King Township) • Mobile HHW depots • HHW collection days (some municipalities)
Composting Facilities • Centralized windrow composting of leaf and yard waste (operated by Miller Waste Systems)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Centralized windrow composting of leaf and yard waste	**Composting Facilities** • Existing centralized windrow leaf and yard waste composting facilities may be closed • *New central composting facility (in vessel) for composting of source separated household organics (wet stream) and leaf and yard waste*	**Composting Facilities** • Centralized windrow composting of leaf and yard waste • *New mixed waste processing and composting facility*
Reuse Centres and Activities • Goods exchange days in Richmond Hill	**Reuse Centres and Activities** • Goods exchange days in Richmond Hill	**Reuse Centres and Activities** • Goods exchange days in Richmond Hill	**Reuse Centres and Activities** • Goods exchange days in Richmond Hill	**Reuse Centres and Activities** • Goods exchange days in Richmond Hill	**Reuse Centres and Activities** • Goods exchange days in Richmond Hill

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
MRFs • Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 • Richmond Hill MRF operated by Miller - 8,400 tonnes processed in 1992. It too will be replaced by planned regional facility • New MRF will be required to meet 20 year needs • Existing MRFs will close when new MRF constructed	**MRFs** • New MRF will be required to meet 20 year needs • Existing/committed MRF in capital budget ($2.2 million) in operation in 1993 • Other MRFs will close when new MRF constructed	**MRFs** • *One new Regional MRF for processing of dry recyclables* • MRF in existing/committed system would close when new MRF operational	**MRFs** • *One new Regional MRF for processing of dry recyclables* • MRF in existing/committed system would close when new MRF operational	**MRFs** • *One new Regional MRF for processing of dry recyclables* • MRF in existing/committed system would close when new MRF operational	**MRFs** • One new Regional MRF for processing of dry recyclables • MRF in existing/committed system would close when new MRF operational

TABLE 6.7
YORK REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	**System 2: Existing/Committed**	**System 3: Direct Cost**	**System 4: Expanded Blue Box**	**System 5: Wet/Dry**	**System 6: Mixed Waste Processing**
Residential Promotion and Education • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools	**Residential Promotion and Education** • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools	**Residential Promotion and Education** • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools • *Promotion/education program on direct cost system* • *Promotion/education program on source reduction, pre-cycling, reuse and recycling*	**Residential Promotion and Education** • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools • *Promotion/education program on Expanded Blue Box program* • *Promotion/education program on source reduction, pre-cycling, reuse and recycling*	**Residential Promotion and Education** • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools • *Promotion/education program for wet/dry system* • *Promotion/education program for source reduction, pre-cycling, reuse, recycling*	**Residential Promotion and Education** • Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities • Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers • Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools • *Promotion/education program on source reduction, pre-cycling, reuse and recycling*

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Garbage Collection and Disposal • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of garbage to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of garbage to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of garbage to landfills and transfer stations by residents • *Direct cost system for garbage collection* • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of garbage to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection** • *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipal forces or contractors to municipalities* • *Collection of residential garbage from multi-family units in three streams, where feasible by municipal forces or private contractors* • Self haul of garbage to landfills and transfer stations by residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Self haul of garbage to landfills and transfer stations by rural residents • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling and Collection • Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include at least ONP, PET, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton • Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of Blue Box materials from single family dwellings and some apartment buildings includes all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations* • Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) • *Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations)* • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • Curbside collection of Blue Box materials from single family dwellings and some apartment buildings includes all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • Collection of bins of recyclables from multi-family units	**Residential Recycling and Collection** • *Curbside collection of Expanded Blue Box materials including plastics (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • *Recycling services for full range of Expanded Blue Box materials at all multi-family buildings with 6 or more units* • *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units*	**Residential Recycling and Collection** • *Provide carts to all single family and some "other" households* • *Separation of waste into three streams (wet, dry and garbage) by the householder* • *Expanded set of dry materials to be collected, including plastics (PET, rigid plastic, bottles & tubes , film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • *Large bins provided in the garbage management area of multi-family buildings, where space available. Residents will be encouraged to separate their waste into three separate bags*	**Residential Recycling and Collection** • Curbside collection of Blue Box materials from single family dwellings and some apartment buildings includes all materials designated basic Blue Box waste and at least two materials designated as supplementary Blue Box waste in the 3Rs Regulations • Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) • Recycling services at all multi-family buildings with 6 or more units (3Rs Regulations) • Collection of bins of recyclables from multi-family units

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling Depots and Transfer Stations • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depots for rural households	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depots for rural households • 7 community recycling centres: 3 in Mississauga, 2 in Brampton, and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste • Construction of satellite drop-off facilities for recycling (Neighbourhood Recycling Depots and Mini Recycling Depots)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots located at transfer stations to provide recycling opportunities to self-haul generators • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depots for rural households • 7 community recycling centres: 3 in Mississauga, 2 in Brampton, and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste • Construction of satellite drop-off facilities for recycling (Neighbourhood Recycling Depots and Mini Recycling Depots)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots located at transfer stations to provide recycling opportunities to self-haul generators • *Drop-off depots for multi-family residents not serviced by recycling, for full range of Expanded Blue Box materials* • *Drop-off depots for rural households (collecting all Expanded Blue Box materials)* • 7 community recycling centres: 3 in Mississauga, 2 in Brampton, and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste • Construction of satellite drop-off facilities for recycling (Neighbourhood Recycling Depots and Mini Recycling Depots)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots *located at compost facility* to provide recycling opportunities to self-haul generators • Drop-off depots for multi-family residents not serviced by recycling • Drop-off depots for rural households • 7 community recycling centres: 3 in Mississauga, 2 in Brampton, and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste • Construction of satellite drop-off facilities for recycling (Neighbourhood Recycling Depots and Mini Recycling Depots)	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill • Depots located at transfer stations to provide recycling opportunities to self-haul generators • 7 community recycling centres: 3 in Mississauga, 2 in Brampton, and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste • Construction of satellite drop-off facilities for recycling (Neighbourhood Recycling Depots and Mini Recycling Depots)
Residential Leaf and Yard Waste Collection • Limited seasonal curbside collection of leaf and yard waste	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • May be some drop-off depots for leaf and yard waste (3Rs Regulations)	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • May be some drop-off depots for leaf and yard waste (3Rs Regulations)	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • May be some drop-off depots for leaf and yard waste (3Rs Regulations)	**Residential Leaf and Yard Waste Collection** • *Collection of leaf and yard waste as part of three stream pick-up* • *Separate brush collection* • May be some drop-off depots for leaf and yard waste (3Rs Regulations)	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • May be some drop-off depots for leaf and yard waste (3Rs Regulations)

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Household Composting • Backyard composter distribution programs (56,839 units to end of 1992) • Limited community composting • Limited vermicomposting	**Residential Household Composting** • Backyard composter distribution programs (56,839 units to end of 1992) • Backyard composters to be used in 68,839 single family households, an addition of 12,000 to existing system • Additional community composting • Additional vermicomposting	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*	**Residential Household Composting** • *Door to door distribution of backyard composters to 80% of single family households* • *Large 3-bin composting units distributed to apartment and co-operative housing complexes* • *Promotion of vermicomposting to multi-family units* • *Promotion of community composting*
Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.) • Special curbside collections of Christmas trees • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees following the Christmas season • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees following the Christmas season • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Special curbside collections of white goods • Drop-off depots for white goods • Once a year HHW collection at Bolton Community Centre • Permanent drop-off depot for HHW at the Britannia Road landfill

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Composting Facilities • Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill)	**Composting Facilities** • Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill)	**Composting Facilities** • Existing centralized windrow leaf and yard waste composting facilities may be closed • *Central composting facilities (in vessel) for composting of source separated household organics (wet stream) and leaf and yard waste*	**Composting Facilities** • Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill) • *New mixed waste processing and composting facility*
Reuse Centres and Activities • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)	**Reuse Centres and Activities** • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)	**Reuse Centres and Activities** • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)	**Reuse Centres and Activities** • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)	**Reuse Centres and Activities** • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)	**Reuse Centres and Activities** • Municipal reuse centre (Caledon Landfill scavenging centre, Albion & Brampton goods exchanges) • Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) • Food reuse organization (such as Second Harvest)
MRFs • Mississauga processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercial/institutional) sector in Mississauga and Brampton. Owned and operated by Laidlaw under contract to the Region • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*	**MRFs** • Laidlaw MRF will remain open but will not be part of the residential system • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*	**MRFs** • Laidlaw MRF will remain open but will not be part of the residential system • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*	**MRFs** • Laidlaw MRF will remain open but will not be part of the residential system • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*	**MRFs** • Laidlaw MRF will remain open but will not be part of the residential system • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*	**MRFs** • Laidlaw MRF will remain open but will not be part of the residential system • MRF/Transfer Station in Bolton for Caledon material • *One new Regional MRF for processing of dry recyclables (to meet 20 year requirement)*

TABLE 6.8
PEEL REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Promotion and Education • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. • *Promotion/education on Direct Cost program* • *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. • *Promotion/education on Expanded Blue Box program* • *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. • *Promotion/education for wet/dry system* • *Promotion/education for source reduction, pre-cycling, composting, reuse and recycling*	**Residential Promotion and Education** • 3Rs promotion and education program, focused on the residential sector • Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. • *Promotion/education for source reduction, pre-cycling, composting, reuse and recycling*

TABLE 6.9
HALTON REGION
RESIDENTIAL SYSTEM COMPONENTS

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Garbage Collection and Disposal • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads	**Garbage Collection and Disposal** • Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities • Collection of residential garbage from multi-family units by municipal forces or private contractors • Collection ban on grass clippings (Oakville) • Landfill bans on some items (e.g. recyclable materials, tires, white goods, etc.) with disposal surcharges and rejection of some loads				
Residential Recycling and Collection • Recycling is mandatory in Halton. All households in the region are served by curbside program, including rural homes and multi-family buildings. Region claims 100% participation, either through curbside pickup or depot service. • Materials include ONP, OCC, telephone directories, PET, HDPE, glass, steel, aluminum, aluminum foil, polystyrene foam, boxboard and fine paper	**Residential Recycling and Collection** • Recycling is mandatory in Halton. All households in the region are served by curbside program, including rural homes and multi-family buildings. Region claims 100% participation, either through curbside pickup or depot service. • Materials include ONP, OCC, telephone directories, PET, HDPE, glass, steel, aluminum, aluminum foil, polystyrene foam, boxboard and fine paper • Addition of 24 new igloos to Igloo Program in 1993 • Purchase of new recycling vehicles - $255,000 allocated • Recycling services to all multi-family buildings with 6 or more units (3Rs regulations)				

TABLE 6.9
HALTON REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Recycling Depots and Transfer Stations • Drop-off depot for dry recyclables at new landfill	**Residential Recycling Depots and Transfer Stations** • Drop-off depot for dry recyclables at new landfill • New HHW depot to be located at new Regional landfill site				
Residential Leaf and Yard Waste Collection • Seasonal curbside collection of leaf and yard waste • Leaf and yard waste collected at region's transfer stations delivered to Scott's Farms in Milton	**Residential Leaf and Yard Waste Collection** • Seasonal curbside collection of leaf and yard waste • Leaf and yard waste collected at region's transfer stations delivered to Scott's Farms in Milton • Oakville has banned the collection of grass clippings • Burlington has proposed a ban on the collection of grass clippings similar to Oakville's				
Residential Household Composting • Backyard composter distribution programs (25,700 units by end of '92) • Limited community composting • Limited vermicomposting	**Residential Household Composting** • Backyard composter distribution programs (25,700 units by end of '92) • Distribution of additional backyard composters - being handled by individual municipalities • Additional community composting • Additional vermicomposting				

TABLE 6.9
HALTON REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.) • Special curbside collections of Christmas trees • Both curbside and drop-off services for white goods • Two permanent HHW depots • Milton collects pumpkins following Halloween and delivers them to a local pig farmer for animal feed	**Other Residential Waste Diversion (HHW, Toxic Taxi, White Goods Collection, White Goods Drop-Off etc.)** • Special curbside collections of Christmas trees • Both curbside and drop-off services for white goods • Two permanent HHW depots • Milton collects pumpkins following Halloween and delivers them to a local pig farmer for animal feed				
Composting Facilities • Scotts Farms in Milton • 1.6 ha windrow facility in Oakville for leaf and yard waste • Other municipalities deliver leaf and yard waste to local farmers and landscaping companies	**Composting Facilities** • Scotts Farms in Milton • 1.6 ha windrow facility in Oakville for leaf and yard waste • Other municipalities deliver leaf and yard waste to local farmers and landscaping companies • One new central composting facility (may be shared with Peel)				

TABLE 6.9
HALTON REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Reuse Centres and Activities • Wastewise in Halton Hills operates as community-based resource centre and diversion facility. Includes four different components: 1. education centre and information service 2. reuse centre accepting and selling household goods 3. repair centre repairing household appliances, power tools and equipment 4. recycling depot for materials not accepted by blue box, including: six grades of plastic, eight grades of paper, scrap metal, textiles, aggregate, egg cartons, rubber, film canisters, coat hangers etc.	**Reuse Centres and Activities** • Wastewise in Halton Hills operates as community-based resource centre and diversion facility. Includes four different components: 1. education centre and information service 2. reuse centre accepting and selling household goods 3. repair centre repairing household appliances, power tools and equipment 4. recycling depot for materials not accepted by blue box, including: six grades of plastic, eight grades of paper, scrap metal, textiles, aggregate, egg cartons, rubber, film canisters, coat hangers etc.				
MRFs • Regional MRF, owned by Region and operated by Halton Recycled Resources Inc. under contract to the Region, processes region's recyclables	**MRFs** • Region now using private MRF owned by Halton Recycled Resources and operated under contract to the Region				

TABLE 6.9
HALTON REGION
RESIDENTIAL SYSTEM COMPONENTS
(continued)

System 1: Existing	System 2: Existing/Committed	System 3: Direct Cost	System 4: Expanded Blue Box	System 5: Wet/Dry	System 6: Mixed Waste Processing
Residential Promotion and Education • Extensive promotion of backyard composting conducted on a municipal level. Promotion efforts include advertising, open houses and seminar hosted by RCO. Halton Hills currently conducting survey to determine community's interest in backyard composting	**Residential Promotion and Education** • Extensive promotion of backyard composting conducted on a municipal level. Promotion efforts include advertising, open houses and seminar hosted by RCO. Halton Hills currently conducting survey to determine community's interest in backyard composting. • $107,400 has been allocated in the 1993 budget for additional waste reduction education programs and display material design to increase participation rates • Wastewise producing a guide on how to start a community resource centre				

TABLE 6.10

LIST OF IC&I SYSTEM COMPONENTS

GTA IC&I Systems	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
IC&I Collection - Dry Wastes	• Voluntary source separation of dry recyclables by some IC&I generators • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipal forces • IC&I depots at transfer stations for use by small business generators • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	• Voluntary source separation of dry recyclables by some IC&I generators • Mandatory source separation of designated materials by major generators (3Rs Regulations) • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipal forces • IC&I depots at transfer stations for use by small business generators • Community recycling centres for use by small quantity IC&I generators • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	• *Mandatory source separation of designated materials by most IC&I generators in GTA (to capture generators of 90% of total IC&I waste - revisions to 3Rs Regulations* • Voluntary source separation of dry recyclables by small IC&I generators • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipal forces • IC&I depots at transfer stations for use by small business generators • Community recycling centres for use by small quantity IC&I generators • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	• Voluntary source separation of dry recyclables by some small IC&I generators • Community recycling centres for use by small quantity IC&I generators • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipal forces • IC&I depots at transfer stations for use by small business generators • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) • *Mandatory source separation of expanded list of designated materials by most IC&I generators (to capture generators of 90% of total IC&I waste - revision to 3Rs Regulations)*	• Voluntary source separation of dry recyclables by some small IC&I generators • *Mandatory source separation of expanded list of designated materials by most IC&I generators (to capture generators of 90% of total IC&I waste - revision to 3Rs Regulations)* • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipalities • IC&I depots at transfer stations for use by small business generators (Metro Toronto) • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) • Community recycling centres for use by small quantity IC&I generators	• Voluntary source separation of dry recyclables by small IC&I generators • Mandatory source separation of designated materials by designated major generators (3Rs Regulations) • Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers • Curbside collection of IC&I recyclables in some areas by municipal forces • IC&I depots at transfer stations for use by small business generators • Community recycling centres for use by small quantity IC&I generators • Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) • *Mandatory processing of all dry wastes prior to landfilling (new policy required by Ontario, or condition on C of A for landfill)*
IC&I Collection - Wet Wastes	• Voluntary source separation of IC&I wet wastes • Separate collection of IC&I wet wastes	• Voluntary source separation of IC&I generated organics • Separate collection of IC&I wet wastes	• Voluntary source separation of IC&I generated organics • Separate collection of IC&I wet wastes	• Voluntary source separation of IC&I generated organics • Separate collection of IC&I wet wastes	• *Mandatory source separation of wet wastes by designed IC&I generators (revision to 3Rs Regulations)* • Voluntary source separation of IC&I generated organics • Separate collection of IC&I wet wastes	• Voluntary source separation of IC&I generated organics • Separate collection of IC&I wet wastes
IC&I Processing - Dry Wastes	• Processing of specific dry materials (e.g. C&D wastes, wood, drywall etc.) in specially designed facilities • Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRF's • Processing of IC&I sector recyclables in small private sector recyclers	• Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities • Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRF's • Processing of IC&I sector recyclables by small private sector recyclers	• *Additional processing capacity for dry recyclables required* • Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities • Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRFs • Processing of IC&I sector recyclables by small private sector recyclers	• *Additional processing for wider list of dry materials required* • Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities • Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRFs • Processing of IC&I sector recyclables by small private sector recyclers	• *Additional processing capacity for dry recyclables* • Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities • Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRFs • Processing of IC&I sector recyclables by small private sector recyclers	• Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities • Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff • Processing of IC&I sector recyclables in municipal MRFs • Processing of IC&I sector recyclables by small private sector recyclers • *Mandatory processing of all dry wastes prior to landfilling (new policy)* • *Mandatory processing of all mixed wastes prior to landfilling (new policy)* • *Additional facilities for processing dry recyclables* • *Additional facilities for processing mixed wastes*

TABLE 6.10

LIST OF IC&I SYSTEM COMPONENTS
(continued)

GTA IC&I Systems	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
IC&I Processing - Wet Wastes	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Centralized composting of IC&I organics in in-vessel system • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector • *New composting facility (in-vessel) for IC&I organics*	• Centralized windrow composting of source-separated IC&I organics • On-site composting of source separated organics generated by the IC&I sector • Vermicomposting at some IC&I locations • Rendering of food wastes from IC&I sector • *New composting facility (in-vessel) for IC&I organics*
IC&I Reuse	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs for small IC&I generators • Use of food wastes as animal feed • Use of food waste for human consumption • Landspreading of IC&I organics • Refilling of IC&I containers and packaging (e.g. refillable bottles, refillable pails, drums, etc.) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs and community recycling centres with reuse programs for small IC&I generators • Use of food wastes as animal feed • Use of food waste for human consumption • Landspreading of IC&I organics • Use of refillable containers (refillable bottles, refillable pails or drums, etc.) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs and community recycling centres with reuse programs for small IC&I generators • Use of food wastes as animal feed • Use of food waste for human consumption • Landspreading of IC&I organics • Use of refillable containers (refillable bottles, refillable pails or drums) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs and community recycling centres with reuse programs for small IC&I generators • Use of food wastes as animal feed • Use of food waste for human consumption • Landspreading of IC&I organics • Use of refillable containers (refillable bottles, refillable pails or drums) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs and community recycling centres with reuse programs for small IC&I generators • *Increased use of food wastes as animal feed* • *Increased use of food waste for human consumption* • *Increased landspreading of IC&I organics* • Use of refillable containers such as packaging by businesses (refillable bottles, refillable pails or drums, etc.) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)	• Reuse by IC&I generators, through the Canadian, Provincial and local waste exchange programs • Community-based reuse programs and community recycling centres with reuse programs for small IC&I generators • Use of food wastes as animal feed • Use of food waste for human consumption • Landspreading of IC&I organics • Use of refillable containers (refillable bottles, refillable pails or drums, etc.) • Use of re-usable packaging (e.g. reusable plastic and wood pallets)
IC&I Reduction	• Voluntary waste reduction actions by IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this includes reuse	• Voluntary waste reduction actions by IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this includes reuse • Mandatory development of waste reduction action plans by designated major IC&I generators (defined in 3Rs Regulations) • Mandatory development of packaging reduction action plans by designated major packaging generators (defined in 3Rs Regulations)	• Voluntary waste reduction actions by IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this includes reuse • Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs Regulations) • Mandatory development of packaging reduction action plans by designated major packaging generators (defined in 3Rs Regulations)	• Voluntary waste reduction actions by small IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this includes reuse • Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs Regulations) • Mandatory development of packaging reduction action plans by designated major packaging generators (defined in 3Rs Regulations)	• Voluntary waste reduction actions by small IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this includes reuse • Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs Regulations) • Mandatory development of packaging reduction action plans by designated major packaging generators (defined in 3Rs Regulations)	• Voluntary waste reduction actions by small IC&I generators • Voluntary reduction of packaging waste by the year 2000 (NAPP) - this included reuse • Mandatory development of waste reduction action plans by designated major IC&I generators (defined in 3Rs Regulations) • Mandatory development of packaging reduction action plans by designated major packaging generators (defined in 3Rs Regulations)

TABLE 6.10

LIST OF IC&I SYSTEM COMPONENTS
(continued)

GTA IC&I Systems	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
IC&I Programs	• Voluntary waste audits performed by IC&I generators • Independent voluntary waste reduction programs in private companies • Voluntary packaging reporting by packaging users (NAPP)	• Voluntary waste audits performed by IC&I generators • Independent voluntary waste reduction programs in private companies • Mandatory waste audits by designated major IC&I generators (3Rs Regulations) • Mandatory packaging audits by designated major packaging generators (3Rs Regulations) • Voluntary packaging reporting by packaging users (NAPP)	• Voluntary waste audits performed by small IC&I generators • Independent voluntary waste reduction programs in private companies • *Mandatory waste audits by most IC&I generators (revision to 3Rs Regulations)* • Mandatory packaging audits by designated major packaging generators (3Rs Regulations) • Voluntary packaging reporting by packaging users (NAPP)	• Voluntary waste audits performed by small IC&I generators • Independent voluntary waste reduction programs in private companies • *Mandatory waste audits by most IC&I generators (revision to 3Rs Regulations)* • Mandatory packaging audits by designated major packaging generators (3Rs Regulations) • Voluntary packaging reporting by packaging users (NAPP)	• Voluntary waste audits performed by small IC&I generators • Independent voluntary waste reduction programs in small private companies • Mandatory waste audits by most IC&I generators (revision to 3Rs Regulations) • Mandatory packaging audits by major packaging generators (3Rs Regulations) • Voluntary packaging reporting by packaging users (NAPP)	• Voluntary waste audits performed by small IC&I generators • Independent voluntary waste reduction programs in small private companies • Mandatory waste audits by most IC&I generators (defined in 3Rs Regulations) • Mandatory packaging audits by major packaging generators (3Rs Regulations) • Voluntary packaging reporting by packaging users (NAPP)
IC&I Promotion and Education	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations • Promotion/education of IC&I waste reduction by associations	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations • Promotion/education of IC&I waste reduction by associations • Mandatory posting of waste reduction plans for review by employees by major IC&I generators (3Rs Regulations)	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations • Promotion/education of IC&I waste reduction by associations • *Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs Regulations)*	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations • Promotion/education of IC&I waste reduction by associations • *Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs Regulations)*	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO) • Promotion/education of IC&I waste reduction by associations • *Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs Regulations)*	• Promotion/education programs focused on reducing waste disposed by the IC&I sector, carried out by the regional municipality • Promotion/education of IC&I waste reduction by non-profit organizations • Promotion/education of IC&I waste reduction by associations • Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs Regulations)

7.0 SYSTEM EVALUATION APPROACH

7.1 Introduction

This chapter presents the approach followed in predicting the net effects of the alternative 3Rs systems. Net effects represent the predicted level of effect remaining from an activity after mitigation and enhancement measures have been taken into account.

Figure 7.1 presents the approach followed in the net effects analysis and evaluation.

7.2 Evaluation Criteria

Based on the study team's understanding of the issues and scope of the study, a set of criteria and indicators was developed as presented in Figure 7.2 and Table 7.1.

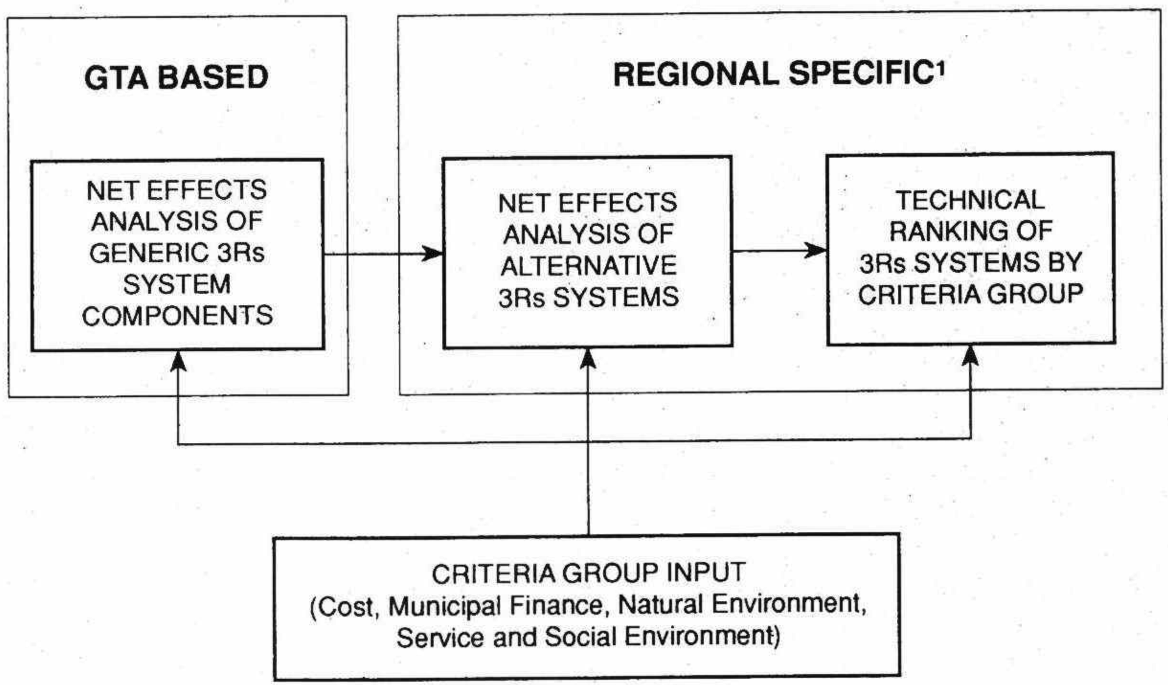
These criteria were categorized under the following criteria groups:

- Cost;
- Municipal Finance;
- Natural Environment;
- Service; and
- Social Environment.

The 3Rs systems were evaluated on the basis of each of these criteria groups.

7.3 Evaluation Criteria Ranking

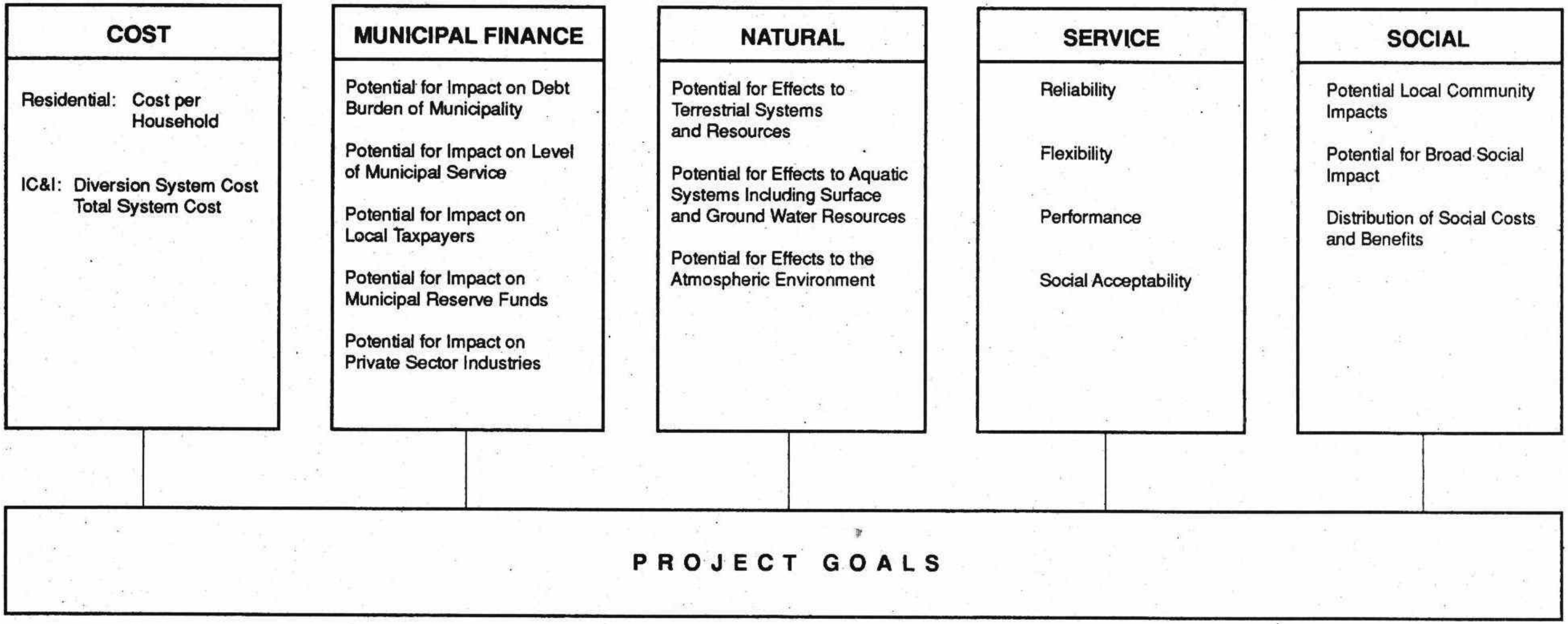
To facilitate the ranking of systems on the basis of each criteria group, the criteria were ranked in terms of their level of importance. The criteria rankings developed within each criteria group were applied in the ranking of 3Rs systems for all Regions. This was due to the generic nature of the analysis and similarities among the study areas. For example, the type of natural environment effects in Durham would likely be similar to effects in Peel.



1. The IC & I systems were evaluated through the same approach but this was done in the context of the GTA.

3Rs SYSTEM NET EFFECTS AND EVALUATION APPROACH

FIGURE 7.1



EVALUATION CRITERIA

FIGURE 7.2

TABLE 7.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I

Criteria Group/Criteria	Indicator	Definition	Rationale
Cost (Residential)			
Cost per Household (system)	· the cost of the waste management system including diversion and disposal on a per household basis	The net cost of the waste management system (diversion and disposal) after revenue sources have been taken into account, divided by the total number of households within the Region.	Considers savings in disposal costs resulting from diversion systems and addresses the goal of minimizing cost.
Cost (IC&I)			
Diversion System Cost	· the cost of the diversion system as expressed as cost per tonne diverted	The net cost of the diversion system divided by the number of tonnes diverted, expressed as $/tonne diverted.	Addresses the goal of minimizing cost.
Total System Cost	· the cost of the total waste management system (disposal plus diversion)	The net cost of the waste management system (diversion and disposal) in $/year.	Considers savings in disposal costs resulting from diversion systems, and addresses the goal of minimizing cost.
Municipal Finance*			
Potential for Impact on Local Taxpayers	· total increase in the net general municipal levy · net general municipal levy, adjusted for commercial/industrial property assessment, expressed on a per household basis (tax proxy) · share of taxation	The net cost of the 3Rs alternative system, after outside or systematic revenue sources have been taken into account, and when included in municipal budgets and added to local property tax levies or billed directly to residents.	To avoid unnecessary or burdensome cost to the local resident, the criterion focuses on determining cost effective system alternatives that minimize taxes and local charges. Addresses the goal of minimizing impacts on human communities.
Potential for Impact on Debt Burden of Municipality	· amount of debenture (long-term) debt · annual debt payments as a percentage of Revenue Fund Expenditures (OMB/MMA Guidelines) · available debt capacity for other municipal purposes (OMB/MMA Guidelines)	The net cost of the 3Rs alternative system, after outside or systematic income sources have been taken into account and when included in municipal budgets are financed by debt instruments or debentures and this added cost must be paid by future local property tax levies.	To avoid an unnecessary debt burden to local residents and allow for other local capital spending practices, the criteria focuses on determining cost effective system alternatives that minimize debt burdens. This in turn also minimizes future taxes and local charges to be paid by residents. Addresses the goal of minimizing impacts on human communities.

* *It should be noted that the criterion "Potential Impact on the Provincial Treasury" was initially considered in the evaluation. During the course of this study, however, it was found that this criterion was insufficient as a basis for comparison.*

TABLE 7.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Potential for Impact on Municipal Reserve Funds	· total amount of reserves and reserve funds · Reserves and Reserve Funds expressed on a per household basis · Reserves and Reserve Funds expressed as a percentage of operating expenditures	The net cost of 3Rs alternatives when financed in whole or in part by municipal reserves.	International financing strategies to avoid debt or tax costs decreases the effectiveness of reserve fund financing for other municipal priorities and reduces the municipality's ability to offset unexpected budget expenditures. Addresses the goal of minimizing impacts on human communities.
Potential for Impact on Level of Municipal Service	· total municipal wages/salaries, material and contract expenditures expressed as a per household basis · current expenditures for each functional department, net inter-department transfers, transfers to reserves, capital costs and debt charges, expressed on a per household basis	The net cost of the 3Rs alternative system, after outside or systematic revenue sources have been taken into account and when included in municipal budgets are financed by relocations in other service areas.	Paying the same for less service is the same as a cost increase. To avoid an unnecessary debt burden to the local residents and allow for other local capital spending priorities, the criteria focuses on determining cost effective system alternatives that minimize debt burdens. Addresses the goal of minimizing impacts on human communities.
Potential for Impact on Private Sector Industries	· the total amount of private sector funding applied to each system alternative · the amount of additional private sector costs applied to each system alternative · the amount of additional private sector costs passed on through higher prices · the cost/savings of the system alternative when financed by the private sector through additional taxes, tax incentives, or market/ economic incentives	The net cost of the 3Rs alternative system, after municipal or Provincial funding sources have been taken into account, and when added to private sector costs, including the costs of crown corporations, that may be added to service or product prices and passed on to the consumer.	To avoid unnecessary or burdensome costs being passed on to the private sector from the public sector, the criterion focuses on capturing the potential social effects on consumers while determining the system alternative cost on private sector industries within the GTA. Addresses the goal of minimizing impacts on human communities.

TABLE 7.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Natural			
Potential for Effects to Terrestrial Systems and Resources	· potential for loss or removal of terrestrial systems and resources · potential for disruption effects to terrestrial systems and resources	This criterion addressed the potential for the loss/removal and disruption to terrestrial systems and resources. This included terrestrial biological systems and forest, mineral and agriculture resources.	Addresses the goal of minimizing impacts on natural environment.
Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources	· potential for loss or removal of aquatic systems including surface water resources · potential for disruption effects to aquatic systems including surface and ground water resources	This criterion addressed potential for the loss/removal and disruption to aquatic systems and resources. This included aquatic biological systems and surface water and ground water resources.	Addresses the goal of minimizing impacts on natural environment.
Potential for Effects to the Atmospheric Environment	· potential for atmospheric emissions	This criterion addressed the potential for effects to the atmospheric environments. This involves effects due to emissions such as gases, odour and dust.	Addresses the goal of minimizing impacts on natural environment.
Service			
Reliability	· proven technology(ies) based on experience in other jurisdictions · degree of reliance on a single approach	This criterion addressed the reliability of the alternatives in terms of providing a continuous service and achieving the service goal of providing reliable diversion. Reliance on a single approach is considered vulnerable to poor performance, if the single approach fails (through breakdown, etc.).	To ensure an ongoing level of service, the selected systems must have a proven level of reliability in order to divert waste on a consistent, continuous basis. A system is more reliable if it involves a number of approaches then breakdown of one component does not cause system failure. Addresses the goal of maximizing service.
Flexibility	· types and range of quantities accepted · compatibility with Existing system	This criterion addressed the ability of the system to accommodate variable waste quantities and characteristics.	A preferable system would be one which can adapt to changing waste quantities and compositions and be integrated with existing facilities. Addresses the goal of maximizing service.

TABLE 7.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Performance	· quantity diverted or requiring landfilling	This criterion addressed the reduction in quantity of waste requiring disposal.	This criterion addressed the goal of maximizing service by maximizing the quantity of waste diverted from landfilling.
Social Acceptability	· participation in 3Rs (current and future) by: - individuals - municipalities - IC&I sector - special/sensitive groups · attitudes and perceptions toward 3Rs activities · willingness to pay	This factor addressed the likelihood of success of an alternative based on current reasons for patterns of participation and on changing attitudes and perceptions toward 3Rs activities over the time horizon of the study. Social acceptance was considered on a Regional and GTA level.	The public, municipalities and the IC&I sector must accept the 3Rs system for it to become fully operational. Preferable systems are those that have a high potential for being socially acceptable. The criterion provided input to the level of service provided by the systems based on potential behaviour or social response. Addresses the goal of maximizing service in terms of waste diversion.
Social			
Potential Local Community Impacts	· potential effects on residents · potential effects on special/sensitive groups · potential effects on communities · potential effects on community features	Projects, programs and processes could lead to positive and negative changes in the lives of people and their communities. Some components of the system, particularly facilities, could create negative impacts on nearby communities, people and businesses. This criterion measured the effect of change on individuals, groups of people and communities. The alternative systems were compared on the basis of the potential effects on residents, communities, community features and businesses.	Some of the 3Rs systems contained public or private facilities, programs and processes which may create local community/neighbourhood impacts. Other programs, while leading to environmental benefit and social responsibility, may be considered by some to be disruptive to their day-to-day activities. Addresses the goal of minimizing impacts on human communities.

TABLE 7.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Potential for Broad Social Impact	· potential for lifestyle changes · potential effect on employment · potential effect on economic development · potential operational effects on institutions, commercial enterprises and industry	This criterion focused on Regional employment, economic and lifestyle changes provided by the 3Rs systems. Changes may be required or may occur in the way residents, government, industry, institutions and agencies behave with respect to the 3Rs. The alternative systems were compared on the basis of employment and economic development effects, their associated economic and institutional barriers and opportunities, and the effects on the broader social character.	Broad social impact considerations addressed the potential positive and negative effects. The 3Rs system may affect the way institutions and businesses behave. And, the behaviour of government, industry, agencies and associations can affect the level and type of 3Rs service possible. Each 3Rs system is likely to have direct and/or indirect effects on employment, economic development and lifestyle. Systems which promote changes in lifestyle which support or encourage greater longer term reduction, reuse and recycling and greater diversion of wastes are preferred. Addresses the goal of minimizing impacts on human communities.
Distribution of Social Costs and Benefits	· distribution of socio-economic effects on industry and population groups · distribution of lifestyle effects · potential future generation effects of system	This criterion considered the distribution of social costs and benefits of the alternative 3Rs systems among population groups and generations. Various system alternatives granted different levels of benefits to specific businesses and user groups, while introducing different levels of negative effect on others. The alternative systems were evaluated on the basis of the types of social costs and benefits that may occur and who may be affected.	The social costs and benefits of the alternative 3Rs systems were evaluated to determine if certain groups bear a greater share of the social costs. It is preferable that those who bear the costs also share equitably in the benefits. The social costs and benefits to future generations were addressed. Addresses the goal of minimizing impacts on human communities.

The criteria within each criteria group were ranked by the study team members responsible for them (i.e. the Social criteria were ranked by the Social discipline).

The following were taken into consideration when ranking criteria:

- The magnitude of effects, (i.e. the actual potential level of net effects that are possible for the range of systems considered). For example, could the highest system cost levels be a significant burden to the municipality or are they all well within normal expenditure levels?

- The duration of effects, (i.e. are effects expected to be during construction (short-term) or during operation (long-term)?

- The significance of effects, (i.e. are effects significant in a Regional or provincial policy context?)

- The certainty of effects, (i.e. will effects definitely occur or are they intermittent or unlikely?)

- The relative difference among options, if a criterion or criteria group shows no difference among options, it cannot be used to compare systems.

The following discusses the criteria ranking rationale within each of the criteria groups.

7.3.1 Cost Criteria Group Criteria Ranking

The Cost criteria group for the residential systems had one criterion - System Cost Per Household. It allowed direct comparison of different systems and it provided a measure of how different systems compare. Because there was only one criterion, criteria ranking within this group was not required.

For IC&I system evaluation, two Cost criteria were considered: 1) Diversion System Cost and 2) Total System Cost. The total cost for the waste management system was considered the more important criterion, as it provided a measure of how different diversion systems compare when all waste management factors were taken into account. If total system costs were not included as an indicator, the financial and cost benefits of the waste diversion systems would not be fully considered. Therefore, the analysis would provide an unbalanced view of the likely financial and cost impacts of each of the six IC&I waste diversion systems.

The cost per tonne of the diversion system was considered less important, but it was valuable in comparing the efficiencies of different approaches to waste diversion from a cost point of view. Systems with a very high cost per tonne diverted were considered less favourable than systems with a low cost per tonne diverted.

The Cost criteria were different for residential and IC&I systems because of the different nature of the residential and IC&I sectors. Household waste generation, the focus of residential waste management systems is not relevant to the IC&I sector. Also, IC&I establishments, the comparable element of the IC&I sector, do not generate as uniform a range of waste materials as is generated by the residential sector.

7.3.2 Natural Environment Criteria Group Criteria Ranking

The Natural Environment criteria group contained three criteria. Two categories of importance were identified for the Natural Environment criteria group. The criteria Potential for Effects to Aquatic Systems Including Surface Water and Ground Water Resources and Potential for Effects to Atmospheric Environment were considered to be equal and the most important. These two criteria were given the highest ranking since potential effects from the 3Rs systems may result in significant loss/removal or disruption of aquatic systems and resources, and exceed established regulatory standards with respect to discharges of contaminants to the atmosphere. The duration of these potential effects may also be throughout the life of the alternative. However, the occurrence of the effects is expected to be intermittent and any effects may be reduced by the mitigative measures.

The criterion Potential for Effects to Terrestrial Systems and Resources was ranked lowest since the magnitude of any effects possible from an alternative system are not expected to result in the significant loss/removal or disruption of terrestrial systems and resources. The potential effects which may occur are expected to occur during the short-term. There is also a high potential to mitigate any effects that are predicted to occur.

The criteria ranking for the Natural Environment criteria group and the rationale for the ranking is provided in Table 7.2.

TABLE 7.2
NATURAL ENVIRONMENT CRITERIA GROUP
CRITERIA RANKING

NATURAL ENVIRONMENT		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Potential for effects to terrestrial systems and resources	2	This criterion is ranked the lowest since the magnitude of effects possible for the range of systems are expected to be within accepted standards. Most effects are unlikely to occur or are expected to occur during the short-term. There is a high potential to mitigate any potential effects by proper siting of new facilities.
Criterion 2		
Potential for effects to aquatic systems including surface water and ground water resources	1	This criterion is ranked the highest since potential effects may be significant exceeding accepted standards. Potential effects may occur throughout the life of the option. The occurrence of the effects is expected to be intermittent. Mitigative measures may reduce effects but will not eliminate them.
Criterion 3		
Potential for effects to atmospheric environment	1	This criterion is ranked the highest since potential effects may be significant exceeding accepted standards. Potential effects may occur throughout the life of the option. The occurrence of the effects is expected to be intermittent. Mitigative measures may reduce effects but will not eliminate them.

1. A ranking of "1" is to represent the criterion considered to be the most important.

7.3.3 Municipal Finance Criteria Group Criteria Ranking

The Municipal Finance criteria group were ranked equally important as no one criterion was determined to be more important than the others in assessing municipal finance impacts.

7.3.4 Social Environment Criteria Group Criteria Ranking

The Social Environment criteria group contained three criteria:

- Potential Local Community Impacts;
- Potential for Broad Social Impacts; and
- Distribution of Social Costs and Benefits.

The conclusion of the ranking process was that, without public input, no single criterion could be determined to be more important than the others. The degree of certainty of the predicted net effects was considered to be the same for each criterion. As a result, different categories of importance did not emerge from the process and all three criteria were given the same ranking.

7.3.5 Service Criteria Group Criteria Ranking

The Service criteria group contained four criteria. These were:

- Reliability;
- Flexibility;
- Performance; and
- Social Acceptability.

Performance and Reliability are considered to be of greatest and equal importance for the Service criteria group. Performance measures the amount of waste diversion (tonnages diverted expressed as a percentage of waste generation). Reliability measures whether systems are likely to work (due to technology and operational factors) and whether the system as a whole is vulnerable to break-down.

These two criteria are given the highest ranking since, when considered together, they provide the strongest and most reliable indicators of whether any significant measure of waste diversion has been or is likely to be achieved. These two criteria provide the best means of assessing the significance, certainty, and magnitude of effects, and highlight the difference among options.

Any system that received a mix of lowest and highest for Performance and Reliability (the two top ranked criteria) were ruled out of contention as highest ranked systems. Where two systems received similar combined rankings overall, the system that achieves greater diversion would have potential to be higher ranked, since it achieves the goal of maximizing diversion.

The criterion Social Acceptability was ranked second in importance. This criterion measures whether the public is likely to reject or accept a system. It provides an indicator of whether residents will participate in source separation and other programs that are fundamental to ensuring diversion performance. This criterion is helpful in evaluating the certainty and duration of effects.

Flexibility was ranked lowest in importance since it is not very helpful in determining the magnitude of differences between the duration, certainty or significance of effects. This criterion evaluates systems according to the type and quantities of waste accepted and system compatibility with the Existing or Existing/Committed system. The logic behind such a criterion is that systems which are proven to be incapable of expansion or that demand significant alteration of existing systems are likely to be faced with greater challenges in terms of ensuring public participation. However, some systems which are not compatible with the Existing system have significant benefits in other areas, and should not be discounted due to lack of flexibility.

Each criterion was evaluated with consideration of existing situations and potential for change. The criteria rankings for the Service criteria group are presented in Table 7.3.

The Service criteria group for the IC&I systems evaluation were ranked differently as outlined in Table 7.4. In the case of IC&I systems, Reliability, Performance and Social Acceptability are all considered equal and most important. The rationale for this slight difference is summarized in Table 7.4.

TABLE 7.3
SERVICE CRITERIA GROUP CRITERIA RANKING
RESIDENTIAL SYSTEMS

DISCIPLINE		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Reliability	1	This criterion was ranked highest as the reliability of a waste diversion system is essential to providing a given level of service. Reliability is a good measure that can be used for distinguishing between different systems. Also, the level of confidence with which diversion of a system can be estimated and maintained with some degree of confidence was an important factor in the final choice.
Criterion 2		
Flexibility	3	Flexibility addresses the range and quantity of materials which can be diverted by a given system, and how compatible it is with the Existing system. Flexibility was ranked least important of the four criteria in the service group, as it is not an essential feature for a waste diversion system. It is an advantage if a system is flexible but other criteria are considered more important.
Criterion 3		
Performance	1	Performance measured as tonnes diverted or % diversion was considered the most important criterion within the service group, as it measures how effective a waste diversion system will be. If performance is not reasonable, then a diversion system should be eliminated from serious consideration as performance is an essential requirement of any system.
Criterion 4		
Social Acceptability	2	Social acceptability was ranked second in importance in the service grouping as it should not be considered a significant factor in the choice of a system; many waste diversion systems become socially acceptable over time.

1. A ranking of "1" is to represent the criterion considered to be the most important.

TABLE 7.4
SERVICE CRITERIA GROUP CRITERIA RANKING
GREATER TORONTO AREA IC&I SYSTEMS

DISCIPLINE		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Reliability	1	Reliability was ranked one of the most important criteria since reliability of a waste diversion system affects performance and participation. Reliability requires a reasonable degree of confidence in performance of the system, and is a en essential feature of a successful system. The major distinguishing feature among systems is the extent to which technologies used or required are proven to be effective.
Criterion 2		
Flexibility	2	Flexibility addresses the range and quantity of wastes processed, and compatibility with the Existing system. Flexibility was ranked as the least important criterion in the Service group as it is not an essential feature of the IC&I waste management system. Although flexibility is an advantage where present.
Criterion 3		
Performance	1	Performance measured as tonnes diverted or % diversion was considered one of the most important criteria within the Service group, as it measures how effective a waste diversion system will be. If performance is not sufficient, then a diversion system does not meet its basic objective of diverting waste from disposal.
Criterion 4		
Social Acceptability	1	Social acceptability was considered as one of the most important criteria in the Service Criteria Group for IC&I systems, as it attempts to measure the burden imposed on individual firms by the different systems, and the extent to which they will respond, and participate in more stringent regulatory or cost requirements. It assists in distinguishing between systems, as those which do not expect reasonable participation will be unable to achieve high diversion levels.

1. A ranking of "1" is to represent the criterion considered to be the most important.

7.4 Net Effects Analysis and Assumptions

Based on the descriptions of the regionally-based 3Rs systems and the criteria developed by the study team, a net effects analysis was undertaken for each individual component contained within each system. This net effects analysis was not specific to regional conditions, rather it generically developed the effects and mitigation associated with the components of each system in the context of the larger GTA. Recognizing the amount of overlap among the alternative systems, this approach was undertaken to reduce the number of net effects tables which would be either the same or very similar. Although the components were organized by each of the developed alternative systems, the GTA-based generic net effects were not summarized at the system level. Rather, the net effects were only developed for each of the component categories listed within each alternative system.

The component categories served as groupings of similar components. It should be noted that GTA based generic net effect tables were not generated for the Cost and Municipal Finance criteria groups as it was not possible to generically assess potential impacts for these two groups.

The components and their net effects were then recombined into the regionally-based 3Rs systems to create the net effects analysis for each residential 3Rs system for each Region. The process of converting the component net effects to the regionally-based system net effects involved first reviewing the components which are in each of the specific regional systems and then identifying any changes to the net effects information as a result of regionally specific data. Each discipline then aggregated its component category net effects by indicator into system net effects by indicator.

In developing the net effects, general mitigation and enhancement measures were developed for the types of potential effects identified to avoid, eliminate or minimize negative effects and, where feasible, to enhance the positive effects. These measures were assumed to be implemented by the appropriate party(ies). The following section discusses how mitigation was applied by each criteria group.

Assumptions followed in the net effects analysis are discussed in Chapter 2.0.

7.5 Mitigation and Enhancement Measures

7.5.1 Overview

Mitigation and enhancement measures were included as part of the assessment and evaluation of 3Rs systems because, if properly implemented, they can avoid, prevent, reduce the severity or redress the effects to the natural environment that are associated with the various system components. These measures are presented in the residential and IC&I generic system net effects tables by component within each Technical Appendix.

The mitigation and enhancement measures were applied at the generic level. The evaluation of site specific effects and appropriate mitigation measures was not possible at the level of detail of this analysis. However, it was appropriate in this analysis to identify the general effects of all the system components, possible mitigation and enhancement measures and the potential net effects.

The success of mitigation and/or enhancement measures was important to the overall system ranking because if they are likely to avoid, prevent or reduce the severity of the negative effects, the net effects of the system will be reduced and its overall ranking may improve. Enhancement measures were applied which enhance the positive effects.

There are effects associated with some of the system components that are unlikely to be fully mitigated. Where this occurs, the net effect was noted. In some cases, where there was uncertainty about the magnitude and significance of the potential effect, the mitigation or enhancement was outlined in general terms.

The following outlines the types of mitigation which were assumed by each criteria group.

7.5.2 Cost

7.5.2.1 Residential System Mitigation

Mitigation measures have not been incorporated in the net effects analysis for the Cost discipline because there are insufficient data to quantity the potential cost advantages. In the absence of mitigation, it was assumed that the costs of any system component would not increase above those reported in 1992 by GTA municipalities. No specific measures were assumed in the systems analysis that would decrease the costs of 3Rs components to values lower than those reported in the literature or by GTA municipalities, which were used in the analysis for the Cost discipline.

The following mitigation measures are possible and should be considered in the design of any residential system:

- all equipment and systems should be maintained in good working order, and should be replaced with state-of-the-art approaches when appropriate;
- economies of scale should be utilized wherever possible;
- frequency of collection could be reduced;
- the degree of source separation and segregation of materials collected could be varied;
- set-out methods and containers could be modified;
- co-collection could be used for different waste streams;
- new technologies should be used for collection, processing and end uses;
- promotion/education should be increased to encourage greater participation; and
- staff training should be increased to enhance productivity.

Such mitigation measures would result in the efficient operation and implementation of all systems. The costs used in the analysis reflect conservative values, and may decrease over time.

7.5.2.2 IC&I System Mitigation

Mitigation measures have not been incorporated in the net effects analysis for the Cost discipline because there are insufficient data to quantify the potential cost advantages. In the absence of mitigation, no specific measures were assumed in the systems analysis that would decrease the costs of 3Rs components to values lower than those reported in the survey of GTA haulers and recyclers which was used in the analysis for the Cost discipline. The costs used in the analysis reflect conservative values, and may decrease over time.

The following mitigation activities are possible and should be considered in the design of IC&I systems:

- all equipment and systems should be maintained in good working order, and should be replaced with state-of-the-art approaches when appropriate;
- economies of scale should be utilized wherever possible;
- collection frequency could be altered when appropriate;
- the degree of source separation and segregation of materials collected would be varied;
- new technologies could be used for collection, processing and end uses;
- promotion/education should be increased to encourage participation and compliance with regulations; and
- staff training should be increased to enhance productivity.

Such mitigation measures would result in the efficient implementation and operation of all systems. The costs used by the analysis reflect conservative values and may decrease over time.

7.5.3 Municipal Finance

Mitigation to the municipalities can be available in the form of provincial funding. However, due to budget and social contract considerations, the amount of grant funding beyond the current Provincial fiscal year is uncertain. Due to these uncertainties, provincial funding was not considered as mitigation in the net effects analysis.

7.5.4 Natural Environment

A wide range of mitigation and enhancement measures was identified for components of the 3Rs systems. Generally, these measures can be organized by both the criterion and by the type of system components. Three criteria were used to assess effects to the natural

environment: Potential for Effects to Terrestrial Systems and Resources; Potential for Effects to Aquatic Systems Including Surface Water and Ground Water Resources; and Potential for Effects to Atmospheric Environment.

Potential for Effects to Terrestrial Systems and Resources

The majority of the potential for effects to terrestrial systems and resources was associated with the facilities required in the 3Rs systems. The effects from facilities may vary and the mitigation measures may be developed to the specific effects. However, the facilities were considered generally in two categories.

The first category included those facilities which are already in place. In the event of an accident at these facilities, loss or removal and disruption to terrestrial systems and resources may result. These facilities/activities included household hazardous waste (HHW) depots, collection days and toxic taxi. An event at one of these facilities resulting in effects may include spills, leaks, fires and vehicle upset. The types of mitigation measures included relocating facilities to alternate locations, including design features at a facility (e.g. sump drains, containment berms, fire prevention equipment) and developing contingency measures for spills, fire control and emergency response, including staff training and appropriate equipment.

The second category of facility included those which are to be developed as part of a system. The development of some facilities may result in the loss or removal of terrestrial systems and resources. This is dependent upon the type and size of facilities. This category included composting facilities, materials recovery facilities (MRF), mixed waste processing facilities, depots and transfer stations. Proper siting of these facilities was identified as an essential mitigation measure.

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

The potential for effects to aquatic systems including surface and ground water resources was mainly associated with the facilities required in the 3Rs systems. The mitigation measures to minimize loss or removal and disruption effects to terrestrial systems were also directly applicable to this criterion. However, additional mitigation measures were considered necessary to minimize effects to aquatic systems and water resources.

These mitigation measures included the development of a storm water management plan (e.g. site grading, runoff collection pond, berms, ditches) and implementing monitoring programs. Similarly, to minimize loss or removal and disruption of ground water

resources, compost facilities would include the collection or attenuation of leachate. These mitigation and enhancement measures were also applied to existing facilities (HHW, compost, MRF) in the 3Rs systems.

Public education and promotion of 3Rs programs, along with enforcement, were identified as mitigation measures to minimize effects due to the illegal dumping of wastes.

Potential for Effects to Atmospheric Environment

For this criterion, the effects from the system components are a result of the day-to-day operations. These effects include emissions to the atmosphere in the form of vehicle exhaust, dust, odours, bioaerosols and other gaseous emissions. Most of these emissions are generated by vehicles or from composting and materials processing operations. These effects are mitigated through regular maintenance and cleaning programs, following proper operating procedures (including public education) and installing control systems to collect and treat the air within a facility.

7.5.5 Social Environment

Mitigation and enhancement measures applied are discussed below for the three social environment criteria: Potential Local Community Impacts; Potential for Broad Social Impact; and, Distribution of Social Costs and Benefits.

Potential Local Community Impacts

The Potential Local Community Impacts criterion is concerned with four types of social effect: potential effects on residents; potential effects on special/sensitive groups; potential effects on communities; and, potential effects on community features and businesses. Most potential local community impacts will result from facility siting and operation. While the possible mitigation measures vary in response to the different characteristics of the facility, the typical mitigation measures fall into two categories: mitigation to address displacement effects and mitigation to address disruption effects.

The first category is mitigation measures to address the potential displacement of residents, businesses and community features associated with the siting of new facilities. The mitigation measures for new facilities typically include proper facility siting and site selection process, and siting in areas of compatible land use.

The second category is mitigation measures which address disruption from nuisance types of effects, (litter, noise, visual, traffic, etc.) and from potentially more significant effects such as odour and potential health hazards associated with new and existing facilities. System components that might include these effects would include depots, community recycling centres, reuse centres, transfer stations, MRFs, leaf and yard waste composting facilities, Wet/Dry facilities and mixed waste processing and composting facilities. Level of effect could vary according to the size and nature of the facility. Typical mitigation measures could include proper siting and management of the facility, state-of-the-art odour control features, consultation with local residents and businesses to address their concerns, and community and health monitoring of the facility operations. However, all potential disruption effects are unlikely to be fully mitigated.

Potential for Broad Social Impact

The Broad Social Impact criterion is also concerned with four types of social effect: potential for lifestyle change; potential effect on employment; potential effect on economic development; and, potential effect on institutions, commercial enterprises and industry. Compared to the Local Community Impacts criterion, this criterion addresses potential effects on people and the community throughout the region.

For the purposes of mitigation and enhancement, the effects on employment and economic development are treated the same. Any increase in employment or improvement in economic development opportunities is considered a benefit and mitigation is not required.

For the other two indicators, nuisance effects are typically experienced at the household level from waste diversion activities. They can include nuisances associated with composters, wet/dry carts, and composting and recycling programs in multi-family buildings. They also can create the potential for a region-wide lifestyle change at the household level. Mitigation measures include strong promotion and education programs to ensure proper management and handling of the material at the household. The programs are assumed to be targeted to all language groups. Other mitigation measures identified include allowing apartment owners/managers to select the system which is suitable to the building and its management.

Distribution of Social Costs and Benefits

The potential effects identified for this criterion address the fairness of the allocation of the effects attributable to the system components. Essentially, this criterion addresses whether there are any groups or individuals who are generally going to experience more social impacts than other groups or individuals. The mitigation measures identified for

the other two criteria are also applicable to this criterion. For example, a negative distribution effect due to facilities is best mitigated by proper facilities and community impact management. While the mitigation measure will reduce the effects, a net negative distribution effect could remain.

For the indicator, Potential Future Generation Effects of System, an enhancement measure involving adequate promotion and education was identified to ensure participation by the current generation to contribute to the maintenance/conservation of environmental quality for future generations.

Social Acceptability

The three Social Acceptability indicators are: participation in 3Rs; attitudes and perceptions towards 3Rs; and, willingness to pay.

Enhancement and mitigation measures that may be applied include: public consultation, 3Rs promotion and education, and measures to address inconveniences to residents and businesses. These measures could enhance participation and positive attitudes by presenting the benefits of being involved in waste diversion activities and providing residents with instructions on how to participate effectively. For example, instructions will ensure residents will properly understand how to manage their composters.

7.5.6 Service

7.5.6.1 Residential System Mitigation

The net effects analysis of residential systems included consideration of steps for enhancement of each component and potential mitigation of problems identified. However, the effects of specific mitigation measures on service (diversion) have not been quantified in the net effects analysis for the Service discipline because there are insufficient data. In many cases, some problems or negative effects have been noted as continuing, even after mitigation.

The following mitigation measures for residential systems, however, are assumed to occur:

Criterion	Indicator	Generic Mitigation
Reliability	Proven technology	· suitable adaptation of technology to local conditions · management and effective process control · provision of contingency and back-up options · appropriate staff training to ensure proper operation and reliability · promotion and education to increase effective participation
	Degree of reliance on singe approach	· promotion of back-up and/or modified components (approach remains the same) to reduce risk of failure · promotion and education to increase effective participation
Flexibility	Types and range of materials, and quantities of waste accepted	· modification of components (approach remains the same) to handle increased range and quantity of materials · promotion and education to increase effective participation
	Compatibility with Existing system	· none applicable
Performance	Quantities of waste diverted	· adequate public education to ensure low contamination rates · promotion campaigns to ensure high participation rates · suitable system design and implementation for local conditions · ongoing market development · support for innovation · ongoing research to increase participation levels in multi-family dwellings

7.5.6.2 IC&I System Mitigation

The net effects analysis for the IC&I systems included consideration of steps for enhancement of each component and potential mitigation of problems identified. However, the effects of specific mitigation measures on service (diversion) have not been quantified in the net effects analysis for the Service discipline because there are insufficient data. In many cases, some problems or negative effects have been noted as continuing, even after mitigation.

The following mitigation measures for IC&I systems are, however, assumed to occur:

Criterion	Indicator	Generic Mitigation
Reliability	Proven technology	· suitable adaptation of technology to local conditions · management and effective process control · provision of contingency and back-up options (approach remains the same) · appropriate staff training to ensure proper operation and reliability · encouragement of compliance and voluntary participation in conditions of regulations
Flexibility	Types and range of materials, and quantities of waste accepted	· modification of components (approach remains the same) to handle increased range and quantity of materials · encouragement of compliance and voluntary participation in conditions of regulations
Performance	Quantities of waste diverted	· encouragement of compliance and voluntary participation in conditions of regulations · suitable system design and implementation for local conditions · ongoing market development · support for innovation - research and development

8.0 REGION OF DURHAM RESIDENTIAL SYSTEMS EVALUATION

The following provides a summary of the residential 3Rs systems evaluation and ranking for Durham Region.

8.1 Cost Criteria Group (Durham Region)

The Cost criteria group contains only one criterion, which is the Cost per Household for the waste management system (diversion and disposal). The criterion was based on the costs of the waste diversion system and the waste disposal system (in $/year), using 1992 dollars and dividing the sum of the costs by the total number of households in each Region. It is estimated for all systems using 1992 waste quantity estimates and unit rates.

8.1.1 Cost Criteria Group - Overall System Ranking

Table 8.1 presents a comparative evaluation of residential systems and overall residential system ranking for Region of Durham based on the total system (diversion plus disposal) cost per household in the year 2000. The system ranking is discussed below.

Systems 1 to 4 ranked equally as highest, with system costs (measured as costs/household/year) in the $117 to $126/household/year range at disposal rates of $50/tonne, and in the $150 to $154/household/year range at disposal rates of $100/tonne. Because the cost/household/year of these systems varies by less than $10, they are considered equally ranked.

System 5 (Wet/Dry) was ranked second highest, at costs of $142 to $163/household/year for disposal rates of $50 to $100/tonne.

System 6 (Mixed Waste Processing) was ranked lowest, with overall system costs of $173 to $184/household/year, if the mixed waste system produces high quality compost, and $176 to $196/household/year if the system produces a low quality compost (i.e. greater quantities of material from the mixed waste processing and composting plant are landfilled due to product quality limitations).

TABLE 8.1

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR COST

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Second highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	· $117 to $153/hh/yr	· $119 to $153/hh/yr	· $122 to $150/hh/yr	· $126 to $154/hh/yr	· $142 to $163/hh/yr	· $176 to $196/hh/yr	· $173 to $184/hh/yr

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

In summary, System rankings for the Cost criteria group are as follows:

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
5 - System 5 (Wet/Dry)
6 - System 6B (Mixed Waste Processing [high quality compost])
6 - System 6A (Mixed Waste Processing [low quality compost])

8.2 Municipal Finance Criteria Group (Durham Region)

The following discusses the Durham Region systems rankings for the Municipal Finance criteria group. System rankings are first discussed by criterion, then for the overall criteria group. It should be noted that the Municipal Finance criteria group examined two Direct Cost system scenarios, tax neutral[1] and added tax[2].

Table 8.2 summarizes the municipal finance system rankings.

8.2.1 Potential Impact on Local Taxpayers

The following describes the system net effects on the local taxpayers. When all elements are considered, gross costs in Durham Region may range from the existing level of $7.2 million per year to $35.8 million per year for the Mixed Waste (System 6B) system. Moreover, while System 2 (Existing/Committed) may present an annual operating cost of $12.8 million per year, System 3A (Direct Cost [tax neutral]) may approach $16.2 million per year, with System 3B (Direct Cost [added tax]) approaching $32.4 million in annual levy costs.

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[1] Under the Direct Cost (tax neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what is now collected via municipal taxes.

[2] Under the Direct Cost (added tax) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

TABLE 8.2

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR MUNICIPAL FINANCE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (tax neutral)	System 3B Direct Cost (added tax)	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Third Highest ranked	Third Lowest ranked	Third highest ranked	Second Lowest ranked	Lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 7,269,337	. 12,815,307	. 16,264,893	· 32,464,893	· 17,529,610	· 21,182,775	· 33,503,317	· 35,853,238
· Tax per household ($)	· 36	· 57	· 70	· 159	· 74	· 88	· 135	· 144
· Share of taxation (%)	· 2%	. 4%	· 4%	· 10%	· 5%	· 6%	· 9%	· 9%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Third highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 9,697,000	· 13,858,000	· 20,436,000	· 20,436,000	· 21,635,000	· 60,186,000	· 88,336,000	· 88,336,000
· Debt payments ($)	. 1,511,000	· 2,159,000	· 3,184,000	· 3,184,000	· 3,371,000	· 9,378,000	· 13,765,000	· 13,765,000
· Debt capacity (%)	· 82%	· 81%	· 79%	· 79%	· 79%	· 70%	· 64%	· 64%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	. 0	· 0	· 0	· 16,200,000	· 0	· 0	· 0	· 0
· Reserves/ household($)	· 0	· 0	· 0	· 88.85	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 39%	· 39%	· 39%	· 42%	· 39%	· 39%	· 39%	· 39%
Impact on Municipal Level of Service	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Operating cost ($)	· 7,269,337	. 12,815,307	. 16,264,893	· 16,264,893	· 17,529,610	· 21,182,775	· 33,503,317	· 35,853,238
. Percent Increase (%)	. 1%	. 2%	. 3%	. 3%	. 3%	. 4%	. 6%	. 6%
Impact on Private Sector Industries	Highest ranked due to:	Second Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Costs ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Higher prices ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Share of private taxes (%)	· 3%	· 6%	· 7%	· 7%	· 8%	· 9%	· 15%	· 16%
n/e -- no effect on residential systems								

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

The household cost of diversion may also be compared to the level of municipal taxation paid in Durham Region. In 1992, diversion activities represented $28.00 per household, or a 1.8% share of total municipal taxes of $1,553.00 per household (excluding school taxes). To estimate the future effects of an increasing tax base on the diversion alternatives the analysis included household growth estimates for Durham.

Household costs range between $36.00 and $144.00 for the various residential systems. System 2 (Existing/Committed) ($57.00), System 3A (Direct Cost [tax neutral]) ($70.00) and System 4 (Expanded Blue Box) ($74.00) all represent between 4 and 5% of household taxes. Further, System 5 (Wet/Dry) ($88.00), System 3B (Direct Cost [added tax]) ($159.00) and System 6 (Mixed Waste Processing) ($135.00 and $144.00 per household) represent above 6% of current average household taxes.

To estimate the effect of each system, a share of taxation guideline was utilized. For example, if taxation specifically related to diversion ranged from 0% to 3% of household taxes, it was considered to have a low effect, while a share of 4% to 6% was considered to have a medium effect, and a share above 7% was considered to be high. It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

Based on this, Systems 5 and 3B (Wet/Dry and Direct Cost [added tax]) would have a high effect on household taxes and are ranked lowest. Systems 2, 3A and 4 (Existing/ Committed, Direct Cost [tax neutral] and Expanded Blue Box) would have a medium effect and are ranked second highest. System 1 (Existing) would have a low effect on household taxes and is ranked highest.

8.2.2 Potential Impact on the Debt Burden of the Municipalities

Since Systems 6A and 6B (Mixed Waste Processing) have the largest capital program, these systems significantly affect Durham Region's associated debt burden. Conversely, since System 2 (Existing/Committed), System 3 (Direct Cost) and System 4 (Expanded Blue Box) have lower capital requirements, Durham Region's debt burden has a lower effect in these systems.

An examination of Durham Region's existing debt charge position, that is, the comparison of debt payments (including principal and interest) to operating expenditures, results in debt charges of 2.3% of costs. The diversion alternatives have the effect of changing these ratios for all systems. With Systems 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost and the Expanded Blue Box) the percentage of debt charges to expenditures

may increase to between 2.6 and 2.9%, while System 5 (Wet/Dry) ratio may increase to 4.0%. The debt charges for System 6 (A+B) (Mixed Waste Processing) may increase to 4.7%.

Similar to the ratio of debt charges to operating expenditures, debt capacity calculations determine the amount of debt available as permitted by the Ministry of Municipal Affairs (former OMB guideline). When estimating debt capacity, using a 9% interest rate and a 10 year term, the total debt capacity for Durham Region approached $373 million. Similar to the previous analysis, the low capital cost system alternatives have relatively minor effect in reducing the Region's debt capacity. When compared to the current 82% level of remaining capacity, System 2 (Existing/Committed) (81%), System 3 (Direct Cost) (79%) and System 4 (Expanded Blue Box) (79%) do not absorb a significant amount of remaining debt capacity. System 5 and 6, however, absorb large amounts of debt capacity, leaving Durham with 70% and 64% respectively.

As a result of the effects, System 1 (Existing) is highest ranked followed by System 2 (Existing/Committed) as second highest. Both Systems 3 and 4 (Direct Cost and Expanded Blue Box) are ranked third highest followed by System 5 (Wet/Dry). System 6 (A+B) (Mixed Waste Processing) is ranked lowest.

8.2.3 Potential Impact on Municipal Reserve Funds

System 3B (Direct Cost [added tax]) has the capacity of generating $16.2 million in revenue that could be placed into reserves and used for other waste management/waste diversion activities. The cost to the household would approximate $88.85. Further, the $16.2 million in additional taxation represents approximately 42% of annual operating results. This compares to a ratio of reserves to operating expenses of approximately 39% for all other systems.

As a result, System 3B (Direct Cost [added tax]) was ranked highest, while all other systems were ranked lowest.

8.2.4 Potential Impact on the Level of Municipal Service

To estimate the effect of each system, the relative level of annual diversion costs was compared to total operating expenditures. In this way, decreases in the level of service resulting from cost increases due to diversion activities can be captured. Cost increases that ranged from 0% to 3% of expenditures were considered to have a low effect. Cost increases of 4% to 6% were considered to have a medium effect and cost increases above 7% were considered to be high.

Both Systems 1, 2 and 3 (Existing, Existing/Committed and Direct Cost) would have a low impact on the municipal service level and ranked highest. Systems 4 and 5 (Expanded Blue Box and Wet/Dry) would have a medium effect on municipal services and ranked second highest. System 6 (A+B) (Mixed Waste Processing) would have a high effect and ranked lowest. However, it should be noted that Durham Region has the discretion to use reserve funds to offset the impact of any of the alternatives put forth to soften the effects.

8.2.5 Potential Impact on Private Sector Industries

While taxes currently collected from the business sector now approach $69.2 million, the percent of tax related specifically to diversion for each system was 3% for System 1 (Existing), and 6% for System 2 (Existing/Committed) both representing a medium effect. System 3, 4, 5 and 6 (Direct Cost [added tax bag charges are only residentially related], Expanded Blue Box, Wet/Dry and Mixed Waste Processing) all represent above a 7% share of business taxes and have a high effect. It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

System 1 (Existing) ranked highest followed by System 2 (Existing/Committed) as second highest. All other systems ranked lowest.

8.2.6 Summary of Effects Analysis

The system alternatives are ranked by the criteria and indicators within the Municipal Finance discipline. The highest ranked system was System 1 (Existing). System 1 represents the least cost to the tax payers (municipal and business) and presents the lowest increase in debt costs. Following the Existing system, System 2 (Existing/Committed) ranked second as the tax increases and resulting debt burdens do not represent significant effects. System 3 (Direct Cost) represent very different revenue strategies which is

reflected in the ranking. System 3A imposes a low cost per household. System 3B imposes an additional cost to the tax payers which is unrelated to service received. This revenue, however, represents an addition to Durham Region's reserves, which is available to assist in further waste management financing. As such, these added funds would be returned to Durham's tax payers in the future. It is for this reason that System 3B (Direct Cost [added tax]) ranked just below the System 3A (Direct Cost [tax neutral]), as the third lowest ranked.

Systems 3A and 4 (Direct Cost [tax neutral] and the Expanded Blue Box) ranked together as the third highest. Both systems were similar in terms of their impact on local taxpayers, impact on debt burden and impact on level of service.

System 6 (A+B) (Mixed Waste Processing) are the lowest ranked because they represent the highest tax effects and also carry the highest capital cost. Similarly, while less burdensome, System 5 (Wet/Dry) also represents a lower ranked system, although it has lower tax and debt effects than the mixed waste systems.

The following summarizes the Durham 3Rs system ranking on the basis of Municipal Finance (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
3 - System 3A (Direct Cost [tax neutral])
3 - System 4 (Expanded Blue Box)
5 - System 3B (Direct Cost [added tax])
6 - System 5 (Wet/Dry)
7 - System 6 (A+B) (Mixed Waste Processing)

8.3 Natural Environment Criteria Group (Durham Region)

The system rankings for the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.3.

For the purpose of the systems evaluation with respect to the natural environment, Systems 6A and 6B were considered to be the same. These system evaluations were combined and are referred to as System 6 (Mixed Waste Processing).

TABLE 8.3

REGION OF DURHAM
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
Natural Environment (Overall Ranking)	Highest ranked with Systems 2 and 4	Highest ranked with Systems 1 and 4	Second lowest ranked with System 5	Highest ranked with Systems 1 and 2	Second lowest ranked with System 3	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · potential loss or removal effects are due to siting new MRF and in the event of accidents at HHW depots · potential disruption effects are due to accidents at HHW depots	Highest ranked due to: · potential loss or removal effects are due to siting new MRF and in the event of accidents at HHW depots · potential disruption effects are due to accidents at HHW depots	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and in the event of accidents at HHW depots · potential disruption effects are due to accidents at HHW depots · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential loss or removal effects are due to siting new MRF and in the event of accidents at HHW depots · potential disruption effects are due to accidents at HHW depots	Lowest ranked due to: · potential loss or removal effects due to siting of new MRF and new central compost facility and accidents at HHW depots · potential disruption effects due to accidents at HHW depots	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and mixed waste processing and composting facility and accidents at HHW depots · potential disruption effects due to accidents at HHW depots
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · potential loss or removal effects due to discharges from existing HHW depots and compost facility · potential disruption effects due to siting new MRF and additional discharges from HHW depots and compost facility	Highest ranked due to: · potential loss or removal effects due to discharges from existing HHW depots and compost facility · potential disruption effects due to siting new MRF and additional discharges from HHW depots and compost facility	Lowest ranked due to: · potential loss or removal effects due to discharges from existing HHW depots and compost facility · potential disruption effects due to siting new MRF and discharges from HHW depots and compost facility · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential loss or removal effects due to discharges from existing HHW depots and compost facility · potential disruption effects due to siting new MRF and additional discharges from HHW depots and compost facility	Second highest ranked due to: · potential loss or removal effects due to discharges from HHW depots and compost facility · potential disruption effects due to siting new MRF and new compost facility and discharges from new compost facility and existing HHW depots	Lowest ranked due to: · potential loss or removal effects due to discharges from HHW depots, central compost facility and mixed waste processing/ compost facility · potential disruption effects due to siting new MRF and mixed waste processing/composting facility and discharges from existing and new facilities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 8.3

REGION OF DURHAM
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions may result from wet waste composting	Lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting facility

8.3.1 Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential for loss or removal and disruption effects due to accidents was expected to be the same for all systems. System 1 (Existing), System 2 (Existing/Committed) and System 4 (Expanded Blue Box) have all the necessary facilities in place with the exception of a new MRF. The development of the materials recovery facility is not expected to result in the loss/removal or disruption of terrestrial systems and resources. These three systems were considered equal and ranked highest. System 3 (Direct Cost) also requires a new MRF. However, the disadvantage of this system is that there is a higher likelihood of illegal dumping of wastes occurring, making it ranked lower than Systems 1, 2 and 4. The disadvantage of Systems 5 and 6 (Wet/Dry and Mixed Waste Processing, respectively) is that both require two new facilities in addition to those which already exist. It is expected that potential effects to terrestrial systems and resources can be effectively mitigated. This includes the siting of new facilities in areas with compatible land uses (i.e. industrial zoned areas). System 5 requires a new MRF and central compost facility. Similarly, System 6 requires a new MRF and a new Mixed Waste Processing and compost facility. Systems 3, 5 and 6 were considered to be equal and have the highest potential for the loss/removal or disruption of terrestrial systems and resources. Although Systems 5 and 6 require one more new facility than System 3, the effects will likely be offset by the illegal dumping of wastes anticipated to occur in System 3.

8.3.2 Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems were expected to occur for reasons similar to effects on terrestrial systems and resources (i.e. location of facility, discharges from the facility, accidents). However, additional effects to aquatic systems may occur due to discharges from 3Rs facilities. These discharges are expected to be in the form of leachate or contaminated surface water runoff from central compost and HHW facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all systems. No additional discharges are expected from the development of the new MRF for Systems 1, 2 and 4. As a result of this advantage, these systems were ranked equal and highest. System 5 was ranked second highest, ahead of Systems 3 and 6. System 5 (Wet/Dry) requires a new MRF and new central compost facility. However, the advantages of this system are that any new discharges are expected to be minimized since only dry recyclable materials are processed at the MRF and the compost

facility is an in-vessel facility. The in-vessel facility also replaces the existing central compost facility. System 3 (Direct Cost) requires only a new MRF but it is anticipated that illegal dumping of wastes will occur as a result of this system. This dumping of wastes and its potential effects on aquatic systems is considered a disadvantage and make the system rank lower. System 6 was considered equal to System 3 and ranked lowest. System 6 requires a new MRF and new Mixed Waste Processing and central compost facility. The potential effects on aquatic systems from these new facilities were expected to be similar to those disadvantages of System 3.

8.3.3 Potential for Effects to the Atmospheric Environment

All six system alternatives were expected to have emissions to the atmosphere. These emissions include dust, odours, and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere are reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. System 1 to 4 do not include the management of wet waste or mixed waste which was considered an advantage. These four systems were considered equal and ranked highest. System 5 includes the composting of wet waste while System 6 includes Mixed Waste Processing and composting. Due to the different nature of the two processes, with wet waste composting to be done using in-vessel technology and Mixed Waste Processing being open to the atmosphere (i.e. windrow technology), the disadvantages of System 6 were considered to be the greatest and the system was ranked lowest.

8.3.4 Overall System Ranking

By considering the ranking of systems by criterion and the criteria rankings together, an overall system ranking can be completed for the Natural Environment criteria group. The Existing, Existing/Committed and Expanded Blue Box systems were ranked highest for each of the three criteria. As a result, these systems were ranked highest overall for the Natural Environment criteria group. System 3 was ranked second lowest along with System 5. This system was ranked lower than Systems 1, 2 and 4 due to disadvantages associated with potential effects to terrestrial systems and resources, and aquatic systems and water resources from siting a new MRF and from illegal dumping of wastes.

System 5 requires a new MRF and central compost facility. Due to the compost facility being an in-vessel facility and other existing compost facilities closing, the overall effects and advantages/disadvantages were considered to be equal to those of System 3.

System 6 (Mixed Waste Processing) was the lowest ranked system for all three criteria. Potential effects to the atmospheric environment from Mixed Waste Processing were considered to be greater than for System 3. The potential effects for the other criteria were considered equal for these two systems.

The overall system ranking for the Natural Environment criteria group in Durham Region is as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 4 (Expanded Blue Box)
4 - System 3 (Direct Cost)
4 - System 5 (Wet/Dry)
6 - System 6 (Mixed Waste Processing)

8.4 Service Criteria Group (Durham Region)

The following discusses Durham Region system rankings for the Service criteria group which are presented in Table 8.4. System rankings are first discussed by criteria then for the overall criteria group. For the Service discipline, System 6 was evaluated as two potential scenarios, namely, System 6A - Mixed Waste Processing with low quality compost and 6B, Mixed Waste Processing with high quality compost. The distinction is crucial to the analysis because compost quality will determine whether the material is used (and for what) and whether it is disposed. This distinction reflects the ultimate waste diversion potential of the system(s) and must be considered in their evaluation.

8.4.1 Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system was dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

TABLE 8.4

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Service (Overall Ranking)	Second lowest	Second lowest	Second highest	Highest	Third highest	Lowest	Second Lowest
Reliability	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Second highest due to: · technologies presently exist and are proven · success relies on economic incentive to increase voluntary source separation by single-family residents · relies also on integration of social approaches	Second highest due to: · technologies presently exist and are proven · relies on increased public participation achieved through extensive education and promotion · also relies on integration of several approaches	Second lowest due to: · technology proven at small scale in North America and at larger scale in Europe · effect of failure is significant as handling of 3 streams are linked in one system. However not readily prone to failure · relies on increased public participation to effectively source separate residential waste into three streams · increased public participation achieved through extensive promotion/education	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 8.4

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest due to: · existing infrastructure handles limited range and quantity of materials · organic materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited	Lowest due to: · existing infrastructure handles limited range and quantity of materials · wet materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Lowest due to: · existing infrastructure handles limited range and quantity of materials · very compatible with Existing/Committed system · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Third highest due to: · collects wider range and higher quantities of materials · compatible with and expands on Existing/Committed system · depends on homeowner for success · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Second highest due to: · collection of wider range and greater quantities of materials (including wet organic waste and others not captured in residential Blue Box programs) · new MRF and new centralized compost plant required to accommodate increased range and quantities of materials · requires fundamental change (modified source separation) to Existing system for residential participation (essential to success)	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality does not meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality unlikely to meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters
Performance	Lowest due to: · waste diversion of 26% to 29% by the year 2000	Lowest due to: · waste diversion of 30% to 33% by the year 2000	Second lowest due to: · waste diversion of 43% to 46% by the year 2000	Second lowest due to: · waste diversion of 44% to 47% by the year 2000	Second highest due to: · waste diversion of 56% to 59% by the year 2000 · significant diversion of food waste (74%)	Second highest due to: · waste diversion of 60% to 63% by the year 2000 · limited source separation may decrease market value of secondary materials · significant diversion of food waste	Highest due to: · waste diversion of 77% to 80% by the year 2000 · limited source separation may decrease market value of secondary materials · significant diversion of food waste

TABLE 8.4

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Third highest ranked due to: · maintains existing 3Rs participation as residents and municipalities are familiar with the requirements of the System · not likely to encourage greater individual action · some positive attitudes and perceptions toward 3Rs activities · residents likely willing to pay for the System (low tax increase)	Third highest ranked due to: · potential for minor positive increase in 3Rs participation because of increased opportunities (e.g., for multi-family residences) · generally positive attitudes and perceptions toward 3Rs activities · residents' willingness to pay increased costs of the System uncertain (moderate tax increase)	Second highest ranked due to: · potential for greater participation through greater source separation of materials (financial incentive); increased composting opportunities; and, greater promotion and education · direct cost charges not implemented in most multi-family buildings; no additional incentives for these households · difficult to implement composting in multi-family housing and unlikely to significantly increase participation (low proportion of households in Durham) · uncertain of implementation of direct cost in rural, self haul areas · potential for public controversy · residents' willingness to pay increased costs of the System uncertain (moderate tax increase)	Highest ranked due to: · potential for greater participation through: greater source separation of more materials; increased composting opportunities; greater promotion and education; and, targeting of all housing types · positive attitudes and perceptions towards 3Rs activities because residents familiar with System requirements · residents' willingness to pay for the System uncertain (moderate tax increase)	Second lowest ranked due to: · potential for reduced participation because of: a variety of inconveniences from collection activities and odour and health concerns related to effects from food waste composting; limited application to high-rise residences; and, uncertain application to rural residences · potential for negative attitudes and perceptions to the System because of inconveniences and health concerns · people are unwilling, unable or lack knowledge to source separate properly, resulting in potential for contamination of dry stream · residents may be unwilling to pay for the System (moderate to high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)

Since the technology has been proven (specifically for the Region of Durham) and the systems are diverse, Systems 1 and 2 (Existing and Existing/Committed) were ranked highest for reliability.

Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively) were equal, and ranked second highest. System 3 (Direct Cost) is based on an approach that is proven although it is based, to a degree, on reliance on a single approach (economic incentive) to produce high participation in diversion systems. System 4 (Expanded Blue Box) is also based on proven technology and it relies extensively on public participation for its success.

System 5 (Wet/Dry) is ranked second lowest because it relies on a single approach (extensive public participation to successfully source separate waste into three streams). The technology is proven at full scale in small counties in North America but not in a community comparable to GTA Regions. Larger scale systems have been successfully implemented in Europe for a number of years.

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished product) were ranked equally and lowest because they are based on technology that is widely used but still experiences technical problems. They also rely on a single approach for the "third bag" of waste.

8.4.2 Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6A and 6B (Mixed Waste Processing with low and high finished compost quality) were ranked highest for Flexibility because they can accommodate the full range and quantity of residential materials generated in Region of Durham. Both systems are compatible with the existing collection system and lead to significantly increased waste diversion.

System 5 (Wet/Dry) was ranked second highest as it collects a wider range and greater quantity of dry materials. It provides a convenient method of diverting significant quantities of wet waste from disposal and is therefore more flexible than all other systems except Mixed Waste Processing. It was limited by the fundamental changes required to the Existing system for residential participation.

System 4 (Expanded Blue Box) was judged third highest for flexibility. While it collects a wider range and quantity of dry materials than the Existing/Committed system, and is compatible with the Existing/Committed System, the overall projected quantities of materials collected are lower than some systems.

Systems 1, 2 and 3 (Existing, Existing/Committed and Direct Cost) are each ranked as lowest for flexibility. Each are compatible with the Existing system, but they do not markedly expand the range of materials collected.

8.4.3 Performance

System performance was judged according to the amount of material diverted or disposed.

System 6B (Mixed Waste Processing with high quality finished compost) was ranked highest due to its ability to divert 77% to 80% of residential waste by the year 2000. System 6A (Mixed Waste Processing with low quality finished product) was ranked second highest with potential to divert 60% to 63% of residential waste. System 5 (Wet/ Dry) was also ranked second highest due to potential to divert 56% to 59% of residential waste.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) are ranked equal and second lowest. System 4 has potential to attain slightly higher diversion (44% to 47% compared to 43% to 46% for Direct Cost).

System 1 (Existing) and System 2 (Existing/Committed) are both ranked lowest due to the low level of material diverted. System 1 diverts 26% to 29% while System 2 would divert 30% to 33% of materials.

8.4.4 Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perceptions of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was ranked the highest because Durham residents and municipalities are familiar with the System components and the infrastructure and can be expected to respond more quickly and more positively to the System. System 4 will provide an improved level of service to

residents over Systems 1 and 2 which is likely to encourage greater participation. However, the willingness of residents to pay the tax increase (a moderate impact) is uncertain but the increase is lower than for Systems 5 and 6.

System 3 (Direct Cost) was ranked the second highest because it has the potential to encourage greater participation in 3Rs (increased composting and source separation) than other systems because of the economic incentive and it is suitable for the low density urban areas of Durham. There is a greater possibility of illegal dumping and burning (with the potential for negative attitudes to be developed toward the System) than in the other systems. Also, Direct Cost charges will not be implemented in apartment households, reducing participation and limiting the potential for a change in attitude to greater support for 3Rs. There is some uncertainty about the willingness of residents to pay the tax increase and about the level of participation by rural residents. In addition, there is greater potential for public controversy than for Systems 1, 2, 4 and 5.

Systems 1 (Existing) and 2 (Existing/Committed) were the third highest ranked because, although residents are familiar with the components of these Systems, the components are unlikely to stimulate increased participation by individuals in 3Rs activities to the same extent as Systems 3,4 and 5. System 1 costs are likely to be acceptable to residents while the acceptability of System 2 costs is uncertain but System 2 is likely to encourage a minor increase in participation over System 1.

System 5 (Wet/Dry) was ranked second lowest. Despite the increased 3Rs opportunities this System offers, its acceptability is reduced because of the odour, health and vermin effects from food waste composting facilities. It may also be difficult for elderly and disabled groups in Durham Region to participate in this System and the effectiveness of the System in rural areas and apartments is uncertain. The willingness of residents to pay the tax increase is uncertain (higher tax increase than Systems 1-4).

System 6 (Mixed Waste Processing) was ranked lowest because: the Mixed Waste Processing and composting facility operations may not be acceptable due to potential significant odour problems; the System does not encourage source separation and could encourage residents to reduce their participation in some of the components of the System (e.g., Blue Box); and, the significantly higher costs for the Mixed Waste Processing and composting facility are likely to be unacceptable to Durham Region residents and municipalities.

8.4.5 Service Criteria Group - Durham Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall Durham Region system ranking was completed for the Service criteria group.

In the Region of Durham, Systems 1 and 2 (Existing and Existing/Committed) were ranked highest for reliability (since the technologies and proven and not prone to failure) and lowest for performance (due to low diversion). System 6B (Mixed Waste Processing, high quality compost) achieved highest diversion, but was ranked lowest for reliability due to reliance on a technology that is widely used but experiences operational problems. These three systems were therefore eliminated from consideration as the highest ranked system.

Systems 3, 4, 5 and 6A were compared to determine the highest ranking. Of these, Systems 3, 4 and 5 were ranked similarly for the combination of performance and reliability which are the two most important criteria. System 5 achieved second highest diversion and was considered second least reliable while Systems 3 and 4 both achieved second lowest diversion and were considered second most reliable. Because System 4 was also most socially acceptable and third most flexible, it was ranked highest overall.

In comparison, System 3 (Direct Cost) was ranked second highest for social acceptability but lowest for flexibility since it collects only a limited range of materials. It therefore received an overall ranking of second highest.

System 5 (Wet/Dry) was ranked lower for social acceptability than Systems 3 and 4 (ranked second lowest due to potential inconveniences, odour problems etc.) and second highest for flexibility (the lowest ranked criterion) since it collects a wider range of materials, including organics. Although its ranking on social acceptability was lower than Systems 1 and 2, it achieved over 35% more potential diversion than either of these systems. It was therefore ranked third highest overall.

Systems 1 and 2 (Existing and Existing/Committed) were ranked second lowest overall. They were considered the most reliable of all systems but they also achieve the lowest diversion of all systems. System 2 is considered as socially acceptable as System 1 (both ranked third highest), but less so than Systems 3 and 4 since both Systems 1 and 2 do little to increase participation in diversion. They are also considered least flexible of all systems because the range and quantities of materials collected are not expanded.

In comparison, System 6B is considered least reliable (due to reliance on a technology that experiences on-going operational problems), but achieves highest diversion. It is considered less socially acceptable (ranked lowest) than Systems 1 and 2 due to potentially high tax increases and potential reductions in Blue Box participation. It is the most flexible of all systems, but since this criterion is considered least important it is ranked equally with Systems 1 and 2 as second lowest.

System 6A was ranked lowest overall. It achieves second highest diversion, but like System 6B, is considered least reliable. With System 6B, it is considered least socially acceptable although it is most flexible of all systems (expanding the range and quantities of materials collected). As this is the lowest ranked criteria and because its diversion is significantly lower than System 6B, this system is ranked lowest overall.

In summary, for the Region of Durham, the system ranking under the Service criteria group was (highest to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 1 (Existing)
4 - System 2 (Existing/Committed)
4 - System 6B (Mixed Waste Processing [high quality compost])
7 - System 6A (Mixed Waste Processing [low quality compost])

8.5 Social Environment Criteria Group (Durham Region)

The system rankings for the three social environmental criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.5.

For the purpose of the systems evaluation for the social environment, Systems 6A and 6B were considered to be the same. These system evaluations were considered to be the same and are referred to as System 6 (Mixed Waste Processing).

TABLE 8.5

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Social Environment (overall ranking)	Lowest ranked	Second lowest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Second highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities · additional potential disruption effects from illegal dumping and burning	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to the new MRF and increased use of existing facilities	Second lowest ranked due to: · potential displacement effects due to new MRF and the new centralized composting facility for wet waste · potential for disruption effects due to new and existing facilities	Lowest ranked due to: · potential displacement effects due to the new MRF and new centralized mixed waste processing and composting facility · potential for disruption effects due to new and existing facilities
Potential for Broad Social Impact	Lowest ranked due to: · little or no potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second lowest ranked due to: · limited potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for negative lifestyle effects associated with illegal dumping and burning	Highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting)	Third highest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but uncertain if the System will realize this potential or lead to reduced participation in source separation · potential for negative lifestyle effects related to inconveniences (associated with wet/dry carts) · limited potential for additional employment and economic development opportunities	Second lowest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but may result in reduced household source separation and contamination of the recyclable stream · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for additional employment and economic development opportunities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 8.5

DURHAM REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · limited potential positive benefit to future generations; system offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second lowest ranked due to: · limited potential positive benefit to future generations; system offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) but limited by lack of application to multi-family housing · limited potential for negative distributional effects from facilities · potential for negative distributional effects on low income groups	Highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) · limited potential for negative distributional effects from facilities	Third highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting), although application to multi-family housing is limited · potential for negative distributional effects due to facilities	Second lowest ranked due to: · potential positive benefit to future generation from highest volumes of waste diverted, but potential for negative effect on future 3Rs behaviour from reduced participation in source separation · potentially equitable distributional effects as 3Rs opportunities targeted to all housing types · potential for negative distributional effects due to facilities

8.5.1 Potential Local Community Impacts

Potential Local Community Impacts can be anticipated in Durham Region as a result of siting new 3Rs facilities and from the expansion and increased use of existing facilities. However, the potential effects of expanded use of existing facilities were taken to be the same for System 1 (Existing), System 2 (Existing/Committed), System 3 (Direct Cost) and System 4 (Expanded Blue Box), and did not lead to one system being ranked over another for this potential effect.

Systems 1 (Existing), 2 (Existing/Committed) and 4 (Expanded Blue Box) were all ranked highest because they require the same existing facilities and a new MRF. Systems 5 (Wet/Dry) and 6 (Mixed Waste Processing) require other additional facilities with potentially more significant local community impacts.

System 3 (Direct Cost) was ranked second highest. While it has the same facilities as Systems 1, 2 and 4, and has the same types of effects as these systems, there is the potential for additional disruption effects from illegal dumping and burning to occur, as residents may react negatively to paying for garbage disposal. Although the significance of the effect is uncertain, the magnitude of illegal dumping may create local community effects in Durham Region greater than Systems 1, 2 and 4.

System 5 (Wet/Dry) was ranked second lowest because it has potential displacement and disruption effects associated with the new Wet/Dry composting facility. While the existing leaf and yard waste composting site would be closed, the effects from the new facility have the potential to be more significant for local communities.

System 6 (Mixed Waste Processing) was ranked the lowest because it has the greatest potential for displacement and disruption effects. In addition to the facilities in place for Systems 1-4, this System will also include a Mixed Waste Processing and composting facility. It is expected that the effects of this facility will be more significant for local communities than the effects of the centralized Wet/Dry composting facility of System 5.

8.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the Region's broad social environment in terms of the lifestyle of people, and the direct employment and economic development opportunities in the Region. An important

consideration in lifestyle change is the level of personal involvement in the management of the household waste; the greater the personal involvement, the more beneficial the lifestyle is taken to be for reducing, reusing and recycling waste.

System 4 (Expanded Blue Box) was ranked highest because it is a continuation of current lifestyles to support 3Rs and is familiar to residents. This should encourage them to separate a greater number of materials, more frequently and with less error than in the other systems. System 4 also has slightly greater potential for additional minor direct employment and economic development opportunities than Systems 1,2,3 and 5. It is easy to implement and suitable to the low density character of Durham Region. Systems 1 (Existing) and 2 (Existing/Committed) do not provide as many source separation opportunities to the same number of people.

System 3 (Direct Cost) was ranked second highest because it would continue the current change to a lifestyle (through an economic incentive to households) that incorporates higher levels of personal involvement by residents in the management of their wastes. The less desirable aspect of this system is that there is a greater potential for some residents to engage in illegal dumping and burning to reduce the amount of waste for which they have to pay collection costs. However, it is uncertain how the System will encourage higher levels of personal involvement in apartment buildings and in rural areas.

System 5 (Wet/Dry) was ranked third highest because it is uncertain whether the System will achieve a change in lifestyle which incorporates significant personal involvement in the management of waste. The opportunity exists for residents to reduce their involvement and not separate their recyclables and compostables, but instead to put them into the garbage stream. In addition, this System may be difficult to implement and inconvenient for residents in apartment buildings and in rural areas. Furthermore, there are potentially a number of inconveniences for a variety of groups (such as the elderly) associated with the Wet/Dry carts. The System has limited potential to provide an increase in direct employment and economic development opportunities.

Systems 2 (Existing/Committed) and 6 (Mixed Waste Processing) were ranked the second lowest because, although they are likely to have some different types and magnitudes of effects, they are likely to have similar potential net effects for Durham Region. The net effect change for these Systems is considered less positive than Systems 3, 4, and 5. System 2 has potential for only a small positive increase in support for a change in lifestyle to more personal involvement of residents in managing their wastes. System 6 has greater potential for direct employment and economic development opportunities than the other systems, but it may not continue the change in lifestyle to support 3Rs behaviour. If residents participate fully in this System it may pose some inconveniences.

System 1 was the lowest ranked because it would not support the continued change of lifestyles toward greater personal involvement in the management of household waste to the extent that the other systems could. This System also has limited potential to provide a positive effect on direct employment and economic development.

8.5.3 Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes for some groups in Durham Region and as a result of effects on future generations. System 4 (Expanded Blue Box) was ranked the highest due to its overall positive current and future generation effects. It provides 3Rs opportunities to more people than Systems 1 (Existing) and 2 (Existing/Committed), and continues the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1 (Existing), 2 (Existing/Committed), and 6 (Mixed Waste Processing). It also has the least negative distribution effects because fewer facilities are required than Systems 5 (Wet/Dry) and 6 (Mixed Waste Processing).

System 3 (Direct Cost) was ranked as the second highest. System 3 has the potential for greater benefit to future generations than Systems 1, 2 and 6. The economic incentive should encourage a change in behaviour to support greater reduction, reuse and recycling which should lead to greater conservation of the environment and a reduction in the management of the current generation's waste by the future. However, there is a potential concern that residents may illegally dump and burn waste. Direct Cost has the potential for a negative distributional effect by increasing the financial burden on low income residents. It does not apply in multi-family buildings and its application to rural areas is uncertain. It also has the most equitable distribution of 3Rs opportunities, equal to Systems 4 and 5, and the least negative effects from facilities, equal to Systems 1, 2 and 4.

System 5 (Wet/Dry) was ranked third highest. This System has the greatest positive distributional effect of 3Rs opportunities, equal to Systems 3 and 4, although there is a concern that it may not be feasible for the elderly, disabled, rural and apartment residents. System 5 also has the greatest possible future generation effects through the wiser use of resources (i.e., reducing, reusing and recycling), equal to Systems 3 and 4. However, this System has the second most significant negative distributional effects from facilities, better only than System 6 (Mixed Waste Processing).

Systems 2 (Existing/Committed) and 6 (Mixed Waste Processing) were ranked equally as the second lowest. System 2 has the second lowest positive effect on future generations with minimal additional support over System 1 (Existing) for changes in lifestyle to encourage greater 3Rs in the present to conserve the environment for the future. It represents a small improvement over System 1 through the provision of 3Rs opportunities to a greater proportion of households. System 6 has the potential for significant negative distributional effects on some residents from the Mixed Waste Processing facility and uncertain potential benefit to future generations through the recovery of more recyclable material from the waste stream with the possibility of influencing behaviour away from the 3Rs. However, it does potentially provide the most equitable distribution of 3Rs opportunities of all the systems, because it is targeted to all housing types.

System 1 (Existing) was ranked the lowest because it is likely to have the least positive distribution effects on future generations by not encouraging a significant change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also does not provide as great an improvement in the distribution of 3Rs opportunities to residents as the other systems. It does have, however, the least potential for negative distribution effects due to facilities.

8.5.4 Overall System Ranking

System 4 (Expanded Blue Box) was the highest ranked system overall, ranking highest for all three criteria.

System 3 was ranked second highest overall as it ranked second highest for all three criteria.

System 5 (Wet/Dry) was ranked third highest on the basis that it was the third highest ranked for both the Distribution of Social Costs and Benefits and Broad Social Impact criteria. It ranked as the second lowest for Potential Local Community Impact. These rankings, overall, provided input to a ranking of System 5 higher than Systems 1,2 and 6. Although Systems 1 and 2 were ranked higher for Potential Local Community Impacts, the rankings for Potential for Broad Social Impact and Distribution of Social Costs and Benefits were significantly higher for System 5 compared to System 1, and higher compared to System 2.

System 2 (Existing/Committed) was ranked the second lowest. It was ranked the highest for the Potential Local Community Impacts criterion and second lowest for the other two social criteria.

Based on the uncertainties involved in the analysis, a judgement could not be made as to whether System 1 (Existing) or System 6 (Mixed Waste Processing) should be ranked higher. System 1 was ranked the highest for Potential Local Community Impacts and the lowest for both Potential for Broad Social Impact and Distribution of Social Costs and Benefits. System 6 was also ranked the lowest because it was ranked as the lowest for Potential Local Community Impact, and second lowest for both Broad Social Impact and Distribution of Social Costs and Benefits.

A summary of the overall system ranking for Durham Region for the Social Environment criteria group is presented below (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - Systems 6 (A+B) (Mixed Waste Processing)

9.0 METRO TORONTO RESIDENTIAL SYSTEMS EVALUATION

The following provides a summary of the residential 3Rs systems evaluation and ranking for Metro Toronto.

9.1 Cost Criteria Group (Metro Toronto)

The following discusses system evaluation for the Cost criteria group. The Cost criteria group contains only one criterion, which is the cost per household for the waste management system (diversion and disposal). The criterion was based on the costs of the waste diversion system and the waste disposal system (in $/year), using 1992 dollars and dividing the sum of the costs by the total number of households in each Region. It is estimated for all systems using 1992 waste quantity estimates and unit rates.

9.1.1 Cost Criteria Group - Overall System Ranking

Table 9.1 summarizes system cost per household data for Metro Toronto based on the system cost per household in the year 2000.

Systems 1 to 5 (Existing, Existing/Committed, Direct Cost, Expanded Blue Box, Wet/Dry) ranked equally as highest, with system costs (measured as cost/household/year) in the $139 to $145/household/year range, at disposal costs of $50/tonne, and $174 to $187/hh/year at disposal costs of 100/tonne. Because system costs do not differ by greater than $10/household/year at both the $50/tonne and $100/tonne disposal rates, these systems are all ranked equally.

System 5 (Wet/Dry) had the lowest cost ($174/household/year), at a disposal rate of $100/tonne, but had similar costs, at $141/household/year, at a disposal rate of $50/tonne.

System 6 (Mixed Waste Processing) was ranked the lowest, with overall system costs of $196 to $213/household/year if the mixed waste system produces a high quality compost, and $204 to $232/household/year if low quality compost is produced (i.e. greater quantities of material from the Mixed Waste Processing and composting plant are landfilled due to product quality limitations).

TABLE 9.1

METROPOLITAN TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR COST

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $139-187/hh/yr	Highest ranked due to: · $140-186/hh/yr	Highest ranked due to: · $141-182/hh/yr	Highest ranked due to: · $145-185/hh/yr	Second highest ranked due to: · $141-174/hh/yr	Lowest ranked due to: · $204-232/hh/yr	Lowest ranked due to: · $196-213/hh/yr

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

In summary, the system rankings for the Cost criteria grouping are:

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
1 - System 5 (Wet/Dry)
6 - System 6B (Mixed Waste Processing [high quality compost])
6 - System 6A (Mixed Waste Process [low quality compost])

9.2 Municipal Finance Criteria Group (Metro Toronto)

The following describes Metro Toronto system rankings for the Municipal Finance criteria group. The individual system rankings are presented first by each criteria and are followed by the overall criteria group rankings.

Table 9.2 summarizes the municipal finance system rankings.

9.2.1 Potential Impact on Local Taxpayers

The following describes the system net effects on the local taxpayers. When all elements are considered, gross costs in Metro Region may range from $48.1 million per year for System 1 (Existing) to $199.3 million per year for System 6A (Mixed Waste Processing [low quality compost]). Further, while System 2 (Existing/Committed) may present a gross annual operating cost of $54.0 million per year, System 3A (Direct Cost [tax neutral]) may approach $60.0 million per year, with System 3B (Direct Cost [added tax]) approaching $111.0 million in annual levy costs.

The household cost of diversion may also be compared to the level of municipal taxation paid in Metro Region. In 1992, diversion activities represented $26.00 per household, or a 1.5% share of total municipal taxes of $1,355.00 per household per year (excluding school taxes). To estimate the future effects of an increasing tax base on the diversion alternatives the analysis included household growth estimates for Metro.

TABLE 9.2

METROPOLITAN TORONTO RESIDENTIAL SYSTEM RANKING SUMMARY FOR MUNICIPAL FINANCE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (tax neutral)	System 3B Direct Cost (added tax)	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
Municipal Finance (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Second lowest ranked	Highest ranked	Highest ranked	Lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Second Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 48,151,759	· 54,005,554	· 60,094,207	· 111,094,207	· 70,337,710	· 63,441,995	· 178,053,123	· 199,315,562
· Tax per household ($)	· 26	· 29	· 32	· 86	· 38	· 34	· 92	· 102
· Share of taxation (%)	· 2%	· 2%	· 2%	· 6%	· 3%	· 3%	· 7%	· 8%
Impact on Municipal Debt Burden	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Third Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 7,090,000	· 16,025,000	· 37,866,000	· 37,866,000	· 42,666,000	· 141,746,000	· 279,866,000	· 279,866,000
· Debt payments ($)	· 1,105,000	· 2,497,000	· 5,900,000	· 5,900,000	· 6,648,000	· 22,087,000	· 43,609,000	· 43,609,000
· Debt capacity (%)	· 74%	· 74%	· 74%	· 74%	· 73%	· 71%	· 68%	· 68%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 51,000,000	· 0	· 0	· 0	· 0
· Reserves/ household($)	· 0	· 0	· 0	· 53.31	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 18%	· 18%	· 18%	· 19%	· 18%	· 18%	· 18%	· 18%
Impact on Municipal Level of Service	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Operating cost ($)	· 48,151,759	· 54,005,554	· 60,094,207	· 60,094,207	· 70,337,710	· 63,441,995	· 178,053,123	· 199,315,562
· Percent Increase (%)	· 1%	· 1%	· 1%	· 1%	· 1%	· 1%	· 3%	· 3%
Impact on Private Sector Industries	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Costs ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Higher prices ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Share of private taxes (%)	· 2%	· 2%	· 3%	· 3%	· 3%	· 3%	· 8%	· 9%
n/e -- no effect on residential systems								

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

Household costs range between $26.00 and $102.00 for the various systems, System 1 (Existing) ($26.00), System 2 (Existing/Committed) ($29.00), System 3A (Direct Cost [tax neutral] ($32.00), System 4 (Expanded Blue Box) ($38.00) and System 5 (Wet/Dry) ($34.00) all represent from 1% to 3% of household taxes. Further, System 3B (Direct Cost [added tax]) (86.00 per household), represents 6% of current average household taxes while Systems 6A and 6B (Mixed Waste Processing) represent a taxation share of above 7%.

To estimate the effect of the system, a share of taxation guideline was utilized. For example, if taxation specifically related to diversion ranged from 0% to 3% of household taxes it was considered to have a low effect, while a share of 4% to 6% was considered to have a medium effect, and a share of above 7% was considered to be high. It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

Based on this, Systems 1, 2, 3A, 4 and 5 (Existing, Existing/Committed, Direct Cost [tax neutral], Expanded Blue Box and Wet/Dry) would have a low effect on local tax payers and ranked highest. System 3B (Direct Cost [added tax]) would have a medium effect and ranked second highest. Systems 6A and 6B (Mixed Waste Processing) would have a high effect on local taxpayers and ranked lowest.

9.2.2 Potential Impact on the Debt Burden of the Municipalities

Systems 6A and 6B (Mixed Waste Processing) had the largest capital programs and highest effect on debt. These systems significantly affect Metro Region's associated debt burden. Since Systems 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost and Expanded Blue Box) have lower capital requirements, Metro's debt burden is affected the least.

An examination of Metro Region's existing debt charge position, that is, the comparison of debt payments (including principal and interest) to operating expenditures, debt charges represented 4.4% of costs. The future diversion alternatives have the effect of changing these ratios for most systems. With Systems 3 and 4 (Direct Cost and Expanded Blue Box), the ratio of debt charges to expenditures may increase to 4.5%. With System 5 (Wet/Dry) debt charges may increase to 4.8%. With Systems 6A and 6B (Mixed Waste Processing) debt charges may increase to 5.2%

Debt capacity calculations (the ratio of debt charges to operating expenditures) determine the amount of available debt permitted by the Ministry of Municipal Affairs (former OMB

guideline). When estimating debt capacity, a 9% interest rate and a ten year term was used, the total debt capacity for Metro Region approached $4,109.9 million. The capital costs for all systems aside from Systems 6A and 6B (Mixed Waste Processing) allow debt capacity to remain at or above 71%. However, Systems 6A and 6B (Mixed Waste Processing) absorb the largest amount of debt capacity, leaving Metro with just 68% of its debt capacity.

Systems 1 and 2 (Existing and Existing/Committed) ranked highest. Systems 3 and 4 (Direct Cost and Expanded Blue Box) ranked second highest followed by System 5 (Wet/Dry) as the third highest. Systems 6A and 6B (Mixed Waste Processing) ranked lowest.

9.2.3 Potential Impact on Municipal Reserve Funds

System 3B (Direct Cost [added tax]) system had the capacity of generating $51.0 million in revenue that could be placed into reserves and used for other waste management/waste diversion activities. The cost to the household would approximate $53.31. Further, the $51.0 million in additional taxation represents approximately 19% of annual operating results. This compares to a ratio of reserves to operating expenditures of 18% for all other alternatives.

As a result of this, System 3B (Direct Cost [added tax]) is the highest ranked because it adds to the Metro's reserve fund position. Systems 1, 2, 3A, 4, 5 and 6 (Existing, Existing/Committed, Direct Cost [tax neutral], Wet/Dry, Expanded Blue Box and Mixed Waste Processing) do not impact the reserve fund and ranked lowest.

9.2.4 Potential Impact on the Level of Municipal Services

To estimate the effect of each system, the relative level of annual diversion costs was compared to total operating expenditures. In this way, decreases in the level of service resulting from cost increases due to diversion can be captured.

All systems other than Systems 6A and 6B (Mixed Waste Processing) would have a low effect on municipal service levels. As a result, these other systems are ranked highest. The Mixed Waste Processing systems are ranked lowest. It should be noted, however, that Metro Region has the discretion to use reserve funds to offset the impact of any of the alternatives put forth to soften the effects.

9.2.5 Potential Impact on Private Sector Industries

While taxes currently collected from the business sector now approach $1.0 billion, tax charges for each system range from 2% for System 1 and 2 (Existing and Existing/ Committed) and 3% for Systems 3A, 4 and 5 (Direct Cost [tax neutral]) (added revenue bag charges are only residentially related), Expanded Blue Box and Wet/Dry), 8% for System 6A (Mixed Waste Processing [low quality compost]) and 9% for System 6B (Mixed Waste Processing [high quality compost]). As a result, all systems are ranked highest other than Systems 6A and 6B (Mixed Waste Processing). It should be noted that a percentage increase in the share of taxes related directly to an increase in taxes.

9.2.6 Summary of Effects Analysis

The following summarizes the above effects by criteria and indicator for Metropolitan Toronto.

Systems 1, 2, 3A, 4 and 5 (Existing, Existing/Committed, Direct Cost [tax neutral], Expanded Blue Box and Wet/Dry) are the highest ranked. These systems would have the least cost impact on the tax payers in Metro and do not present significant debt costs to the financial structure. System 3B (Direct Cost [added tax]) imposes an additional cost to the tax payers which is unrelated to service received. This revenue, however, represents an addition to Metro's reserves, which are then available to assist in further waste management financing for other projects. As such, these added funds would be returned to tax payers in the future. As a result, System 3B (Direct Cost [added tax]) is the second lowest ranked.

Systems 6A and 6B (Mixed Waste Processing) are the lowest ranked systems because they carry the highest tax effects and also the highest capital costs.

The following summarizes the system rankings for Metro Toronto with respect to Municipal Finance (highest ranked to lowest ranked).

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3A (Direct Cost [tax neutral])
1 - System 4 (Expanded Blue Box)
1 - System 5 (Wet/Dry)
6 - System 3B (Direct Cost [added tax])
7 - Systems 6 (A+B) (Mixed Waste Processing)

9.3 Natural Environment Criteria Group (Metro Toronto)

The system rankings for each of the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 9.3.

When evaluating Systems 6 (A+B) (Mixed Waste Processing), these systems were considered to be the same with respect to the natural environment. These systems were combined and referred to as System 6 for the evaluation.

9.3.1 Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources are predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset conditions. The potential for loss or removal and disruption effects due to accidents was expected to be the same for all six systems. Systems 1, 2 and 4 (Existing, Existing/Committed and Expanded Blue Box respectively) were considered equal and each ranked highest since they had similar advantages. Systems 1, 2 and 4 all include the same new MRF, resulting in similar effects to terrestrial systems and resources for the systems.

System 3, the Direct Cost system, also includes the same new MRF. However, this system is ranked lower due to the disadvantage of the higher likelihood of illegal dumping of wastes and its resulting effects. The Direct Cost system was the lowest ranked system in terms of potential for effects to terrestrial systems and resources along with Systems 5 and 6. System 5 (Wet/Dry) requires two new 3Rs facilities while System 6 (Mixed Waste Processing) requires three new facilities. The effects from these facilities, and the advantages/disadvantages of the systems, were considered equal to System 3 given that all facilities would be located in a highly urbanized area.

TABLE 9.3

METRO TORONTO
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Natural Environment (Overall Ranking)	Highest ranked with Systems 2 and 4	Highest ranked with Systems 1 and 4	Second lowest ranked with System 5	Highest ranked with Systems 1 and 2	Second lowest ranked with System 3	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · potential loss or removal effects due to siting new MRF and in the event of accidents at HHW depots or toxic taxi · potential disruption effects are due to accidents at HHW depots or toxic taxi	Highest ranked due to: · potential loss or removal effects due to siting new MRF and in the event of accidents at HHW depots or toxic taxi · potential disruption effects are due to accidents at HHW depots or toxic taxi	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and in the event of accidents at HHW depots or toxic taxi · potential disruption effects are due to accidents at HHW depots or toxic taxi · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential loss or removal effects due to siting new MRF and in the event of accidents at HHW depots or toxic taxi · potential disruption effects are due to accidents at HHW depots or toxic taxi	Lowest ranked due to: · potential loss or removal effects due to siting of new MRF and new central compost facility and accidents at HHW depots or toxic taxi · potential disruption effects due to accidents at HHW depots or toxic taxi	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and two new mixed waste processing and composting facilities and accidents at HHW depots or toxic taxi · potential disruption effects due to accidents at HHW depots or toxic taxi
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · potential disruption effects due to siting new MRF and discharges from HHW depots, toxic taxi and central compost facilities · potential loss or removal effects due to discharges from existing facilities	Highest ranked due to: · potential disruption effects due to siting new MRF and discharges from HHW depots, toxic taxi and central compost facilities · potential loss or removal effects due to discharges from existing facilities	Lowest ranked due to: · potential disruption effects due to siting new MRF and discharges from HHW depots, toxic taxi and central compost facilities · potential loss or removal effects due to discharges from existing facilities · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential disruption effects due to siting new MRF and discharges from HHW depots, toxic taxi and central compost facilities · potential loss or removal effects due to discharges from existing facilities	Second highest ranked due to: · potential disruption effects due to siting new MRF and siting new central compost facility · potential loss or removal and disruption effects due to discharges from existing facilities and new compost facility	Lowest ranked due to: · potential disruption effects due to siting new MRF and two new mixed waste processing/ composting facilities · potential loss or removal and disruption effects due to discharges from existing facilities and from new mixed waste facilities

***Note:** Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.*

TABLE 9.3

METRO TORONTO
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions may result from wet waste composting	Lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting facilities

9.3.2 Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems and water resources were expected due to facility location, discharges from a facility and accidents. Leachate or contaminated surface water runoff from HHW and central compost facilities was expected to result in the most significant effects. All systems were considered equal with respect to effects as a result of discharges from existing facilities. Systems 1, 2 and 4 have similar advantages and were ranked equally and highest. These three systems require the same new 3Rs facility, a MRF. System 5 (Wet/Dry) was ranked second highest. This system requires a new MRF and central compost facility. However, an advantage of this system is that any discharges are expected to be minimized since only dry recyclables are processed at the MRF and the compost facility is an in-vessel facility. The in-vessel facility would also replace all existing windrow compost facilities.

The disadvantages of System 3 (Direct Cost) and System 6 (Mixed Waste Processing) resulted in both systems being ranked lowest. The Direct Cost system has the same new facility requirements as Systems 1, 2 and 4. However, due to the higher likelihood of illegal dumping of wastes in the Direct Cost system, the system was ranked lower. System 6 requires a new MRF and two Mixed Waste Processing facilities. The potential for effects due to discharges from these facilities was considered to be greater than those facilities required by the other systems. The effects are expected to be minimized since the facilities will be located in a highly urbanized area.

9.3.3 Potential Effects to the Atmospheric Environment

The six system alternatives were expected to have emissions to the atmosphere. These emissions include dust, odours, bioaerosols and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. Emissions to the atmosphere are reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmosphere from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. Systems 1, 2, 3 and 4 do not include the management of wet waste or mixed waste which was considered an advantage. These four systems were equally ranked as highest.

System 5 (Wet/Dry) was ranked second lowest of the systems. This system includes wet waste composting at an in-vessel facility. As a result additional emissions are expected.

This facility also replaces the existing central windrow compost facilities. System 6 was ranked lowest. This system includes the processing and composting of mixed wastes at two locations. This system is lowest ranked due to the nature of the wastes being managed and since the processing and composting of wastes is less controlled (i.e. windrow facility) than at an in-vessel compost facility.

9.3.4 Overall System Ranking

Combining the ranking of systems by criterion and the criteria rankings allows an overall system ranking to be completed for the Natural Environment criteria group. For each of the three criteria, the Existing, Existing/Committed and Expanded Blue Box systems were ranked highest. Systems 1, 2 and 4 were the highest ranked systems overall. System 5 was ranked lower than these three systems due to potential effects to terrestrial systems and aquatic systems as a result of siting new 3Rs facilities and discharges from the new central compost facility. This lower ranking was also due to the disadvantage of the potential for effects to the atmospheric environment from the composting of wet waste.

System 3 (Direct Cost) was ranked second lowest of the systems overall along with System 5 (Wet/Dry). The Direct Cost system requires a new MRF, while System 5 requires a MRF and central compost facility. However, the higher likelihood of illegal dumping of wastes occurring in the Direct Cost system, and its effects to terrestrial and aquatic systems, is a disadvantage which results in the lower overall ranking. When considering the Wet/Dry system, the potential effects to aquatic systems are reduced by in-vessel composting but there is expected to be an increase in emissions to the atmosphere from wet waste composting.

System 6 was ranked lowest overall for the six systems. This system was expected to have the greatest potential for effects to the atmosphere from Mixed Waste Processing and composting. Similarly, potential effects to aquatic systems were expected to be the greatest of all systems due to siting of the mixed waste facility and discharges from the facility.

The following summarizes the Metro Toronto system ranking from the natural environment perspective (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 4 (Expanded Blue Box)
4 - System 5 (Wet/Dry)

4 - System 3 (Direct Cost)
6 - Systems 6 (A+B) (Mixed Waste Processing)

9.4 Service Criteria Group (Metro Toronto)

The following discusses Metro Toronto system rankings for the Service criteria group which are presented in Table 9.4. System rankings are first discussed by criteria then for the overall criteria group. For the Service discipline, System 6 was evaluated as two potential scenarios, namely, System 6A - Mixed Waste Processing with low quality compost and 6B, Mixed Waste Processing with high quality compost. The distinction is crucial to the analysis because compost quality will determine whether the material is used (and for what) and whether it is disposed. This distinction reflects the ultimate waste diversion potential of the system(s) and must be considered in their evaluation.

9.4.1 Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system was dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology has been proven (specifically for Metro Toronto) and the systems are diverse, Systems 1 and 2 (Existing and Existing/Committed) were ranked equally and highest with respect to reliability. Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively), were considered equal and ranked second highest.. System 3 (Direct Cost) is based on a proven approach whose reliability is somewhat dependent on a single approach (economic incentive to encourage high participation in diversion systems) which does not affect multi-family housing (which makes up a large portion of Metro households). For these reasons, it is less reliable than are Systems 1 and 2.

System 4 (Expanded Blue Box) is based on proven technology and is supported by public participation but is not reliant on a single approach.

TABLE 9.4

METRO TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Service (Overall Ranking)	Second lowest	Third lowest	Second highest	Highest	Third highest	Lowest	Second Lowest
Reliability	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Second highest due to: · technologies presently exist and are proven · success relies on economic incentive to increase voluntary source separation by single-family residents · relies also on integration of social approaches	Second highest due to: · technologies presently exist and are proven · relies on increased public participation achieved through extensive education and promotion · also relies on integration of several approaches	Second lowest due to: · some Metro residents participated in a Wet/Dry pilot project · technology proven at small scale in North America and at larger scale in Europe · effect of failure is significant as handling of 3 streams are linked in one system. However not readily prone to failure · relies on increased public participation to effectively source separate residential waste into three streams · increased public participation achieved through extensive promotion/education	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 9.4

METRO TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest due to: · existing infrastructure handles limited range and quantity of materials · organic materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited	Second lowest due to: · existing infrastructure handles limited range and quantity of materials · partially expanded range of materials will be maintained · new materials (fine paper, pizza boxes, polycoat) added to Blue Box) · wet materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Third lowest due to: · existing infrastructure handles limited range and quantity of materials · very compatible with Existing/Committed system · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Third highest due to: · collects wider range and higher quantities of materials · compatible with and expands on Existing/Committed system · depends on homeowner for success · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Second highest due to: · collection of wider range and greater quantities of materials (including wet organic waste and others not captured in residential Blue Box programs) · new MRF and new centralized compost plant required to accommodate increased range and quantities of materials · requires fundamental change (modified source separation) to Existing system for residential participation (essential to success)	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality does not meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality unlikely to meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters
Performance	Lowest due to: · limited waste diversion of 19% or up to 22% by the year 2000	Lowest due to: · limited waste diversion of only 21% or up to 24% by the year 2000	Second lowest due to: · estimated waste diversion of 29% or up to 32% by the year 2000	Second lowest due to: · estimated waste diversion of 33% or up to 36% by the year 2000	Third highest due to: · estimated waste diversion of 44% or up to 47% by the year 2000 · significant diversion of food waste (64%)	Second highest due to: · estimated waste diversion of 52% or up to 55% by the year 2000 · limited source separation may decrease marked value of secondary materials · significant diversion of food waste	Highest due to: · potential for 72% to 75% waste diversion by the year 2000 · limited source separation may decrease marked value of secondary materials · significant diversion of food waste

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 9.4

**METRO TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)**

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Second lowest ranked due to: · maintains existing 3Rs participation as residents and municipalities are familiar with the requirements of the System · not likely to encourage greater individual action · some positive attitudes and perceptions toward 3Rs activities · residents likely willing to pay for the System (low tax increase)	Second highest ranked due to: · potential for minor positive increase in 3Rs participation because of increased opportunities (e.g., for multi-family residences) · generally positive attitudes and perceptions toward 3Rs activities · residents likely willing to pay for the System (low tax increase)	Third highest ranked due to: · potential for greater participation through greater source separation of materials (financial incentive); increased composting opportunities; and, greater promotion and education · direct cost charges not implemented in most multi-family buildings; no additional incentives for these households · difficult to implement composting in multi-family housing and unlikely to significantly increase participation (significant proportion of households in Metro) · potential for public controversy · residents likely willing to pay increased costs of the System (low tax increase)	Highest ranked due to: · potential for greater participation through: greater source separation of more materials; increased composting opportunities; greater promotion and education; and, targeting of all housing types. · positive attitudes and perceptions towards 3Rs activities because residents familiar with System requirements · residents likely willing to pay for the System (low tax increase)	Second lowest ranked due to: · potential for reduced participation because of: a variety of inconveniences from collection activities and odour and health concerns related to effects from food waste composting; and, limited application to high-rise residences · potential for negative attitudes and perceptions to the System because of inconveniences and health concerns · people are unwilling, unable or lack knowledge to source separate properly, resulting in potential for contamination of dry stream · residents likely willing to pay for the System (low tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facilities may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities. · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facilities may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

System 5 (Wet/Dry) is ranked second lowest as it relies somewhat on a single approach (extensive public participation to successfully source separate household waste into three streams). While the technology is proven, it may be limited in its ability to include multi-family buildings which make up a significant proportion of Metro's housing stock (48.6%), and it is proven only in small-scale projects in North America.

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished compost) were both ranked lowest because they are based on a technology that is widely used but still experiences technical problems. Systems 6A and 6B also rely on a single approach for the "third bag" of waste.

9.4.2 Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished compost) were ranked highest for flexibility because they can handle the full range and quantity of residential materials. Both systems were judged to be compatible with the existing collection system and to lead to significantly increased waste diversion.

System 5 (Wet/Dry) was ranked second highest as it collects a wider range and greater quantity of dry materials than Systems 1, 2 and 3. System 5 also provides the capacity to divert significant quantities of wet household (food and yard) waste, which can not be diverted to the same extent by Systems 1 to 4.

System 4 (Expanded Blue Box) was ranked third highest for flexibility. It collects a wider range and quantity of dry materials than Systems 1, 2 and 3, and is compatible with the Existing/Committed system. However, the overall projected quantities of materials collected are lower than in some systems and it does not have the flexibility to divert significant quantities of wet materials.

System 3 (Direct Cost) is ranked third lowest. It is compatible with the Existing system and is ranked higher than System 2 because it diverts higher quantities of the same range of materials. System 2 (Existing/Committed) is ranked second lowest. While compatible with the Existing system, it will handle only a slightly increased range of materials. System 1 (Existing) is ranked lowest because it diverts a more limited range and quantity of materials, when compared with the other systems.

9.4.3 Performance

System performance was judged according to the amount of material diverted by each system, expressed as a percentage of the waste generated. For diversion estimates it was assumed that markets would exist for all recovered materials.

System 6B was ranked highest for performance because it is estimated to divert 72% to 75% of the residential waste stream by the year 2000, although the potential lower quality of secondary materials may reduce their marketability.

System 6A (Mixed Waste Processing with low quality finished compost) was ranked second highest with potential to divert 52% to 55% of the residential waste stream. System 5 was ranked third highest with potential to divert 44% to 47% of the residential waste stream. The reason for the lower diversion potential of this system, compared with other GTA Regions, is the limited ability to collect all multi-family housing waste in three source separated streams.

System 3 (Direct Cost) and System 4 (Expanded Blue Box) were ranked equally and second lowest. System 3 offers diversion potential between 29% and 32% while System 4 has potential to divert between 33% and 36% of the residential waste stream.

System 1 (Existing) and System 2 (Existing/Committed) were ranked lowest, due to the lower level of material diverted. With a range of 19% to 22% (Existing) and 21% to 24% (Existing/Committed) respectively.

9.4.4 Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perceptions of 3Rs activities and the willingness of Metro residents to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was ranked highest because Metro residents and municipalities are familiar with the System components and the infrastructure and can be expected to respond more quickly and more positively to the System. System 4 appears to be more suitable to the broad range of housing density patterns in Metro than either Systems 3 or 5, equal to System 6 and more comprehensive than either Systems 1 or 2. Therefore, System 4 should lead to increased participation, and improved attitudes and perceptions. Residents will likely be willing to pay the tax increase for the System.

System 2 was ranked the second highest because it has greater potential for positive attitudes and participation than System 1; it will not encounter the potential public controversy to System 3; it does not have the same inconveniences as System 5 which reduce that System's participation; and residents are more willing to pay for this System than System 6.

System 3 (Direct Cost) was ranked third highest. While this System provides greater opportunities than System 2 (Existing/Committed) for composting and source reduction, there is the likelihood of some initial negative attitudes associated with the Direct Cost System. More importantly, System 3 (Direct Cost) may have little effect in increasing participation in high-rise apartments beyond that of System 2 (Existing/Committed). It will not provide the incentive to these residents to participate and is not likely to increase positive attitudinal change. The Direct Cost System also has a higher potential for illegal dumping than any other System, with the potential for negative attitudes to be developed toward the System.

System 5 (Wet/Dry) was ranked second lowest. In the low-density areas of Metro Toronto, this System may be acceptable with strong participation and some increase in positive attitudes, although some concerns are expected to be expressed about the convenience of the System. Residents will likely be willing to pay the increase in taxes. In Metro's high-density areas (a large proportion of households) this System may create negative attitudes and lead to low participation rates. The concerns are likely to focus primarily on the health, odour and nuisance effects of the "wet" stream, and how it is collected and managed in high-rise apartments.

System 1 (Existing) was also ranked second lowest because it provides limited support for continuing positive change in 3Rs behaviours and it provides fewer 3Rs opportunities than any of the other systems. However, it has few negative attitudes associated with the System components; residents are likely willing to pay for the System; and, it has little or no potential for public controversy.

System 6 (Mixed Waste Processing) was ranked the lowest. Due to the potential odour effects, there is likely to be significant opposition to a mixed solid waste processing and composting facility. The components of this System are available to all households (equal to Expanded Blue Box) and it encourages 3Rs involvement. However, there is the potential for the System to deter many people from source separating, reducing their participation in 3Rs and potentially reducing positive attitudes and behaviour to 3Rs. The convenience of disposing of all waste, knowing that it will be separated elsewhere, may prompt some Metro residents to stop separating their waste. Furthermore, residents and municipalities may not be willing to pay the higher tax increase required with this System.

9.4.5 Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall system ranking was completed for the Service criteria group.

In Metro Toronto, System 6B received a highest and highest ranking for performance with a lowest ranking for reliability. The same was true (in reverse) for the Existing and the Existing/Committed Systems which received highest rankings for reliability and lowest for performance. The three systems were therefore eliminated from consideration as the highest ranked systems.

Systems 3, 4, 5 and 6A were then compared to determine the highest ranked system. All four systems received comparable rankings on the combinations of highest ranked criteria (performance and reliability). Systems 3 (Direct Cost) and 4 (Expanded Blue Box) achieved second lowest diversion and were considered second most reliable. System 6A Mixed Waste Processing (low quality compost) achieved second highest diversion but was considered least reliable, while System 5 (Wet/Dry) achieved third highest diversion but was considered second least reliable.

System 4 was ranked highest for social acceptability and third highest for flexibility. Because social acceptability is more important than flexibility, System 4 was ranked highest overall. In comparison, System 3 was ranked slightly lower for social acceptability and flexibility (third highest and third lowest respectively) and it was therefore ranked second highest overall. With a slightly lower rank for social acceptability (second lowest) and a second highest ranking for flexibility, System 5 was ranked third highest overall.

System 2 (Existing/Committed) achieved the lowest diversion but was considered most reliable overall. System 2 was ranked third lowest overall, since it was considered more socially acceptable (ranked second highest) than Systems 1 (Existing) or 6A and 6B (Mixed Waste Processing with low and high quality compost) but less flexible than Systems 3, 4 and 5. Systems 1 and 6B both ranked second lowest. They received similar combined rankings (in reverse) on the top two criteria. System 6B was ranked lowest for social acceptability and highest for flexibility.

System 1 achieved lowest diversion and was ranked highest for reliability. It was considered second least socially acceptable and lowest for flexibility. The diversion achieved in System 6B is significantly higher than in System 1, as is the ranking for flexibility, and there is little difference in social acceptability. System 1 was therefore ranked second lowest overall, along with System 6B.

System 6A was ranked lowest overall. It achieves second highest diversion (less than System 6B), but is considered least reliable of all systems. It is also considered least socially acceptable, and while it is most flexible of all systems, this is the least important criterion.

In summary, the residential system ranking for Metro Toronto under the Service criteria group was (highest to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - System 6B (Mixed Waste Processing [high quality compost])
7 - System 6A (Mixed Waste Processing [low quality compost])

9.5 Social Environment Criteria Group (Metro Toronto)

The system rankings for the three social environment criteria for discussed below. The system rankings, by criterion, are summarized in Table 9.5.

For the purpose of the systems evaluation for the social environment, Systems 6A and 6B were considered to be the same. These system evaluations were considered to be the same and are referred to as System 6 (Mixed Waste Processing).

9.5.1 Potential Local Community Impacts

Potential Local Community Impacts can be anticipated in Metro Toronto as a result of siting new 3Rs facilities and from the expansion and increased use of existing facilities. However, the potential effects of expanded use of existing facilities were taken to be the same for Systems 1 (Existing), 2 (Existing/Committed), 3 (Direct Cost) and 4 (Expanded Blue Box) and did not lead to one system being ranked over another for this potential effect.

TABLE 9.5

METRO TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Social Environment (Overall Ranking)	Third lowest ranked	Second highest ranked	Third highest ranked	Highest ranked	Second lowest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Highest ranked due to: · potential displacement effects due to new MRF and leaf and yard waste bunkers · potential disruption effects due to new MRF, leaf and yard waste bunkers and increased use of existing facilities	Second highest ranked due to: · potential displacement effects due to new MRF and leaf and yard waste bunkers · potential disruption effects due to new MRF, leaf and yard waste bunkers and increased use of existing facilities · additional potential disruption effects from illegal dumping and burning	Highest ranked due to: · potential displacement effects due to new MRF and leaf and yard waste bunkers · potential disruption effects due to the new MRF, leaf and yard waste bunkers and increased use of existing facilities	Second lowest ranked due to: · potential displacement effects due to new MRF, leaf and yard waste bunkers and the new centralized composting facility for wet waste · potential for disruption effects due to new and existing facilities	Lowest ranked due to: · potential displacement effects due to the new MRF, leaf and yard waste bunkers and the two new centralized mixed waste processing and composting facilities · potential for disruption effects due to new and existing facilities
Potential for Broad Social Impact	Lowest ranked due to: · little or no potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second highest ranked due to: · limited potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Third highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · potential for negative lifestyle effects related to inconveniences (e g , increased composting) · potential for negative lifestyle effects associated with illegal dumping and burning	Highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · minor potential for negative lifestyle effects related to inconveniences (e g , increased composting)	Third highest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but uncertain if the System will realize this potential or lead to reduced participation in source separation · potential for negative lifestyle effects related to inconveniences (associated with wet/dry carts), particularly in high density areas of Metro · limited potential for additional employment and economic development opportunities	Second lowest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but may result in reduced household source separation and contamination of the recyclable stream · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for additional employment and economic development opportunities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 9.5

METRO TORONTO
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Distribution of Social Costs and Benefits	Second lowest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second highest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) but limited by lack of application to multi-family housing · limited potential for negative distributional effects from facilities · potential for negative distributional effects on low income groups	Highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) · limited potential for negative distributional effects from facilities	Second lowest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting), although application to multi-family housing is limited · potential for negative distributional effects due to facilities	Lowest ranked due to: · potential positive benefit to future generation from highest volumes of waste diverted, but potential for negative effect on future 3Rs behaviour from reduced participation in source separation · potentially equitable distributional effects as 3Rs opportunities targeted to all housing types · potential for negative distributional effects due to facilities

Systems 1 (Existing), 2 (Existing/Committed) and 4 (Expanded Blue Box) were all ranked highest because they all require the same new facilities (the new leaf and yard waste bunkers in Systems 2-6 were considered minor). Although there is likely to be additional volumes of materials handled at the facilities in System 4, the materials will be mainly dry and the importance of the potential social effects is uncertain. System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) require other additional facilities with potentially more significant local community impacts.

System 3 (Direct Cost) was ranked second highest. Although it requires the same new facilities as Systems 1, 2 and 4, and has the same types of effects as these Systems, there is the potential for additional disruption effects from illegal dumping to occur with System 3. Although the significance of the effects is uncertain, the magnitude of illegal dumping may create local community effects in Metro Toronto greater than Systems 1, 2 and 4.

System 5 (Wet/Dry) was ranked second lowest because of displacement and disruption effects due to siting and operating the centralized wet/dry composting facility. Effects are also predicted due to the increased volumes of all types of materials and the addition of food waste to the composting stream. The health and odour issues associated with the composting facility may be more significant than with the Systems 1-4. Although the existing leaf and yard waste facilities would be closed, the effects from the new facility have the potential to be more significant for local communities.

System 6 (Mixed Waste Processing) was ranked lowest due to the requirement for two mixed waste processing and composting facilities. The potential displacement effects and the potential disruption effects related to odour and health concerns are potentially more significant for this System than the other systems.

9.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on Metro Toronto's broad social environment in terms of the culture and lifestyle of people, and employment and economic development opportunities. An important consideration in lifestyle change is the level of personal involvement in the management of the household waste; the greater the personal involvement, the more beneficial the lifestyle is taken to be for reducing, reusing and recycling waste.

System 4 (Expanded Blue Box) was ranked the highest because it enables continuation of the change in lifestyle to support 3Rs and residents are familiar with the System. This should encourage residents to source separate more effectively than other systems. It has

the potential for greater inconvenience than Systems 1 and 2, but, as most people are willing to take on some inconvenience for actions that they think will improve the environment, the inconvenience associated with this System are not considered significant. Systems 1 and 2 do not provide as many source separation opportunities to as many people. System 4 also has greater potential for minor direct employment and economic development opportunities than Systems 1, 2, 3 and 5.

System 2 (Existing/Committed) was ranked second highest. The components of this System will be convenient for residents and some components are applicable in high density areas. System 2 has less potential for minor direct employment and economic opportunities than Systems 3-6 and it provides for minor support for a change in lifestyles toward more personal involvement of residents in managing their wastes.

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked third highest. System 3 would continue the current change to lifestyle because, by charging for garbage disposal, residents are given an incentive to increase their personal involvement in household waste management and to source separate more consistently. It should help encourage a change to a lifestyle that incorporates 3Rs behaviour. It will also result in a minor increase in opportunities for direct employment and economic development over Systems 1 and 2. However, in System 3 there is a potential for some residents to engage in illegal dumping to reduce the amount of waste involving collection costs. As well, System 3 does not represent an additional incentive to apartment dwellers to recycle and therefore will not, on its own, lead to increased source separation. This is significant given the large number of apartment dwellers in Metro Toronto.

While System 5 (Wet/Dry) has the potential to bring about a minor increase in direct employment and economic development over Systems 1, 2 and 3, there is a greater potential for lifestyle conveniences than in Systems 2, 3 and 4. It also appears to be difficult to implement in high density households (apartments are a major portion of Metro's housing). Metro's residents are generally older than the residents in the GTA. And, System 5 is likely to have greater potential effects on special/sensitive groups (e.g., elderly and disabled) due to the requirement for all people to use 90 gallon carts for their waste and separated materials.

System 6 was ranked second lowest. It is uncertain as to whether System 6 will achieve a change in lifestyle, as a strong opportunity will exist for residents not to separate their recyclables and compostables and put them into the garbage stream instead.

System 1 was ranked lowest. Although it is the most convenient system, it has very limited potential to support a change in lifestyle to greater personal involvement of

residents in managing their waste. It also has limited potential for increasing direct employment and economic development opportunities.

9.5.3 Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes for some groups in Metro and as a result of effects on future generations. System 4 (Expanded Blue Box) was the highest ranked due to its overall positive current and future generation effects. System 4 provides 3Rs opportunities to more people and provides a more equitable distribution of 3Rs opportunities among housing types by providing composting opportunities to multi-family households than Systems 1 and 2. It continues the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1 and 2. It also has fewer negative distribution effects than Systems 5 and 6 because fewer facilities are required.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked equally as the second highest. System 2 has the second least negative distribution effect from facilities, equal to Systems 3 and 4, and provides 3Rs opportunities to a greater proportion of households than System 1, including households in high density areas. System 3 improves the distribution of 3Rs opportunities over Systems 1 and 2 by providing the opportunity to participate in 3Rs activities to a higher proportion of households, but it provides a lower distribution of opportunities than System 5 because the direct cost charges will not apply to multi-family households.

System 3 has the potential for greater benefit to future generations than Systems 1, 2 and 6. The economic incentive should encourage a change in behaviour to support greater reduction, reuse and recycling which should lead to greater conservation of the environment and a reduction in the management of the current generation's waste by the future. System 3 has the potential for a negative distributional effect by increasing the financial burden on low income residents and it will require acceptance by Metro's range of cultural groups. This System also has the second least negative distributional effects from facilities.

Systems 1 (Existing) and 5 (Wet/Dry) were ranked equally as the second lowest based on the uncertainties associated with the significance and magnitude of the different potential effects of the Systems. System 5 has a greater potential for negative distributional effects from new facilities than Systems 1, 2, 3 and 4, and a Wet/Dry system in apartment buildings may create long term negative perceptions to 3Rs activities, affecting the 3Rs behaviour of current and future residents. Although System 5 has potential significant

benefits to future generations if all residents participate effectively in the System, this is off-set by the large proportion of households in Metro which may not be provided with the full service and the potential for a behavioural change to net source separation.

System 1 (Existing) ranked second lowest because it is likely to have a less positive distribution effect on future generations by not encouraging a significant change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It does not provide an improvement in the distribution of 3Rs opportunities to residents compared to other systems. However, it does have the least negative distribution effects that might be caused by facilities.

System 6 (Mixed Waste Processing) was ranked lowest as it has the greatest potential for negative distributional effects on some Metro residents from facilities. There is also the uncertainty of the benefit to future generations through the recovery of more material from the waste stream and the possibility of influencing behaviour away from the 3Rs. The potential for positive benefit to future generations is therefore considered to be less than for the other systems. However, System 6 potentially provides the most equitable distribution of 3Rs opportunities of all systems because it is targeted to all housing types.

9.5.4 <u>Overall System Ranking</u>

System 4 (Expanded Blue Box) was ranked highest overall because it ranked highest for all three of the Social Impact Criteria.

System 2 (Existing/Committed) was ranked second highest overall. It was ranked highest for Potential Local Community Impacts and second highest for both Broad Social Impacts and Distribution of Social Costs and Benefits.

System 3 (Direct Cost) was ranked third highest overall. It was ranked second highest for Potential Local Community Impacts and Distribution of Social Costs and Benefits and was ranked third highest for Broad Social Impacts.

System 1 (Existing) was ranked as the third lowest because, while it ranked lowest for Broad Social Impacts and second lowest for Distribution of Social Costs and Benefits, these rankings were off-set by a highest ranking for Potential Local Community Impacts.

System 5 (Wet/Dry) was ranked second lowest on the basis that it was second lowest for both Potential Local Community Impacts and Distribution of Social Costs and Benefits and third highest for Broad Social Impacts.

System 6 (Mixed Waste Processing) was ranked lowest because it was ranked as second lowest for Broad Social Impacts but lowest for both Local Community Impacts and Distribution of Social Costs and Benefits.

The following summarizes the Metro Toronto 3Rs system rankings from the Social Environment perspective (highest ranked to lowest ranked).

1	-	System 4 (Expanded Blue Box)
2	-	System 2 (Existing/Committed)
3	-	System 3 (Direct Cost)
4	-	System 1 (Existing)
5	-	System 5 (Wet/Dry)
6	-	Systems 6 (A+B) (Mixed Waste Processing)

10.0 REGION OF YORK RESIDENTIAL SYSTEMS EVALUATION

The following provides a summary of the residential 3Rs systems evaluation and ranking for York Region.

10.1 Cost Criteria Group (York Region)

The following discusses system evaluation for the Cost criteria group. The Cost criteria group contains only one criterion, which is the cost per household for the waste management system (diversion and disposal). The criterion was based on the costs of the waste diversion system and the waste disposal system (in $/year), using 1992 dollars and dividing the sum of the costs by the total number of households in each Region. It is estimated for all systems using 1992 waste quantity estimates and unit rates.

10.1.1 Cost Criteria Group - Overall System Ranking

Table 10.1 summarizes system cost per household data for the Region of York based on system cost per household in the year 2000.

Systems 1 to 4 ranked equally as highest, with system costs (measured as cost/household/year) in the $126 to $130/household/year range, if disposal costs are $50/tonne, and $160 to $173/household/year if disposal costs are $100/tonne. Because system costs do not differ by greater than $10/household/year at both the $50/tonne and $100/tonne disposal rates, these systems are all ranked equally.

System 5, Wet/Dry, is ranked second highest with system costs of $149 to $175/household/year at disposal rates of $50 to $100/tonne respectively.

System 6, Mixed Waste Processing, was ranked the lowest, with an overall system costs of $188 to $202/household/year, if the Mixed Waste Processing system produces a high quality compost, and $194 to $218/household/year if low quality compost is produced (i.e. greater quantities of material from the Mixed Waste Processing and composting plant are landfilled due to product quality limitations).

TABLE 10.1

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR COST

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Second highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $130-173/hh/yr	Highest ranked due to: · $130-173/hh/yr	Highest ranked due to: · $126-160/hh/yr	Highest ranked due to: · $127-161/hh/yr	Second highest ranked due to: · $149-175/hh/yr	Lowest ranked due to: · $194-218/hh/yr	Lowest ranked due to: · $188-202/hh/yr

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

In summary, system ranking for the Cost criteria group is as follows (highest to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
5 - System 5 (Wet/Dry)
6 - System 6 (A+B) (Mixed Waste Processing [low and high quality compost])

10.2 Municipal Finance Criteria Group (York Region)

The following describes York Region system rankings for the Municipal Finance criteria group. The individual system rankings are presented first by criteria and are followed by overall criteria group rankings.

Table 10.2 summarizes the municipal finance system rankings.

10.2.1 Potential Impact on Local Taxpayers

The following describes the system net effects on the local taxpayers. When all elements are considered, gross costs in York Region may range from the existing level of $6.8 million per year to $46.1 million per year for System 6B (Mixed Waste Processing [high quality compost]). Further, while System 2 (Existing/Committed) may present a gross annual operating cost of $11.6 million per year, System 3A (Direct Cost [tax neutral]) may approach $15.7 million per year, with System 3B (Direct Cost [added tax]) approaching $36.1 million in annual levy costs.

The household cost of diversion may also be compared to the level of municipal taxation paid in York Region. In 1992, diversion activities represented $21.00 per household, or a 1.7% share of total municipal taxes of $1,223.00 per household per year (excluding school taxes). To estimate the future effects of an increasing tax base on the diversion alternatives the analysis included household growth estimates for York.

TABLE 10.2

REGION OF YORK
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR MUNICIPAL FINANCE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (tax neutral)	System 3B Direct Cost (added tax)	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Third Highest ranked	Third Lowest ranked	Third Highest ranked	Second Lowest ranked	Lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 6,816,445	. 11,655,865	. 15,708,196	· 36,108,196	· 16,078,818	· 24,583,692	· 41,552,524	· 46,152,961
· Tax per household ($)	· 29	· 44	· 56	· 149	· 57	· 83	· 136	· 150
· Share of taxation (%)	· 2%	. 4%	· 5%	· 12%	· 5%	· 7%	· 11%	· 12%
Impact on Municipal Debt Burden	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 11,733,000	· 14,853,000	· 24,090,000	· 24,090,000	· 25,290,000	· 73,606,000	· 106,690,000	· 106,690,000
· Debt payments ($)	. 1,828,000	· 2,314,000	· 3,754,000	· 3,754,000	· 3,941,000	· 11,469,000	· 16,624,000	· 16,624,000
· Debt capacity (%)	· 69%	· 68%	· 66%	· 66%	· 66%	· 55%	· 48%	· 48%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	. 0	· 0	· 0	· 20,400,000	· 0	· 0	· 0	· 0
· Reserves/ household($)	· 0	· 0	· 0	· 92.56	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 49%	· 49%	· 49%	· 52%	· 49%	· 49%	· 49%	· 49%
Impact on Municipal Level of Service	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Operating cost ($)	· 6,816,445	. 11,655,865	. 15,708,196	. 15,708,196	· 16,078,818	· 24,583,692	· 41,552,524	· 46,152,961
. Percent Increase (%)	. 1%	. 2%	. 3%	. 3%	. 3%	. 4%	. 7%	. 8%
Impact on Private Sector Industries	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Costs ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Higher prices ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Share of private taxes (%)	· 3%	· 4%	· 6%	· 6%	· 6%	· 9%	· 16%	· 17%
n/e -- no effect on residential systems								

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

To estimate the effect of the system, a share of taxation guideline was utilized. For example, if taxation specifically related to diversion ranged from 0% to 3% of household taxes it was considered to have a low effect, while a share of 4% to 6% was considered to have a medium effect, and a share of above 7% was considered to be high. It should be noted that a percentage increase in the share of taxes relates to an increase in taxes.

Household costs range between $29.00 and $150.00 for the various Systems. System 2 (Existing/Committed) ($44.00), System 3A (Direct Cost [tax neutral]) ($56.00) and System 4 (Expanded Blue Box) ($57.00) all represent from 4% to 6% of household taxes and were considered to have a medium effect. Further, System 5 (Wet/Dry) ($38.00), System 3B (Direct Cost [added tax]) ($149.00) and Systems 6A and 6B (Mixed Waste Processing) ($136.00 and $150.00 respectively) all represent above a 7% share and were considered to have a high effect.

System 1 (Existing) ranked highest followed by System 2 (Existing/Committed). Systems 3A and 4 (Direct Cost [tax neutral] and Expanded Blue Box) ranked second highest. All other systems ranked lowest.

10.2.2 Potential Impact on the Debt Burden of the Municipalities

Since Systems 1 and 2 (Existing and Existing/Committed) require the least level of additional debt and as a result of having the lowest capital costs they ranked highest. Systems 4 and 3 (Expanded Blue Box and Direct Cost) have similar capital requirements, and York's debt burden is similarly affected; these systems are second highest. System 5 (Wet/Dry) is the second lowest ranked system. Systems 6A and 6B (Mixed Waste Processing) have the largest capital programs and affect the Region's debt burden the most and, therefore, are the lowest ranked systems.

An examination of York Region's existing debt charge position, that is, the comparison of debt payments (including principal and interest) to operating expenditures, indicated that debt charges represented 2.6% of operating costs. The future diversion alternatives have the effect of changing these ratios for all systems. The continuation of System 1 (Existing) and System 2 (Existing/Committed) may raise debt charges to 2.9 and 3.0% of expenditures respectively. For Systems 3 and 4 (Direct Cost and Expanded Blue Box), the ratio of debt charges to expenditures may increase to 3.2%. With System 5 (Wet/Dry) at 4.5% and Systems 6A and 6B (Mixed Waste Processing), debt charges may increase to 5.4%

Debt capacity calculations (the ratio of debt charges to operating expenditures) determines the amount of available debt permitted by the Ministry of Municipal Affairs (former OMB guideline). When estimating debt capacity (a 9% interest rate and a 10 year term was used), the total debt capacity for York Region approached $461.1 million. The capital costs for Systems 6A and 6B (Mixed Waste Processing) reduce the Region's debt capacity to 48%, while System 3 (Wet/Dry) reduces capacity to 55%. These are the lowest and second lowest ranked systems respectively. Systems 1 and 2 (Existing and Existing/Committed) absorb the least amount of debt, leaving York with 69% and 68% respectively and were the highest ranked systems. Systems 4 and 3 (Expanded Blue Box and Direct Cost) systems are second highest ranked systems reducing the debt capacity to 66%.

10.2.3 Potential Impact on Municipal Reserve Funds

System 3B (Direct Cost [added tax]) had the capacity of generating $20.4 million in revenue that could be placed into reserves and used for other waste management/waste diversion activities. The cost to the household would approximate $92.56. Further, $20.4 million in additional taxation represents approximately 52% of annual operating results. This compares to a ratio of reserves to operating expenditures of 49% for all other systems.

As a result of this, System 3B (Direct Cost [added tax]) is the highest ranked since it adds to the Region's reserve fund position. Conversely, Systems 1, 2, 3A, 4, 5 and 6 (A+B) (Existing, Existing/Committed, Direct Cost [tax neutral], Expanded Blue Box, Wet/Dry and Mixed Waste Processing Systems) are the lowest ranked even though they do not affect the reserve fund.

10.2.4 Potential Impact on the Level of Municipal Services

To estimate the effect of each system, the relative level of annual diversion costs was compared to total operating expenditures. In this way, decreases in the level of service resulting from cost increases due to diversion can be captured. Cost increases that ranged from 0% to 3% of expenditures were considered to have a low effect. Cost increases of 4% to 6% were considered to have a medium effect and cost increases above 7% were considered to be high.

System 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost and Expanded Blue Box) would all have a low effect on municipal service levels and ranked highest. Conversely, Systems 6A and 6B (Mixed Waste Processing) would have a high effect on municipal service levels and ranked lowest. System 5 (Wet/Dry) would as a result of its operating costs have a medium effect on municipal service levels and ranked second highest. It should be noted, however, that York Region has the discretion to use reserve funds to

offset the impact of any of the alternatives put forth to soften the effects of any of the systems.

10.2.5 Potential Impact on Private Sector Industries

While taxes currently collected from the business sector now approach $77.9 million, tax charges for each system range from 3% for the Existing system to 4% for the Existing/Committed. Systems 3 and 4 (Direct Cost and Expanded Blue Box) share of taxation would be 6%. Systems 5 and 6 (Wet/Dry and Mixed Waste Processing) share of taxation would be 9%, 16% and 17% respectively. It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

System 1 (Existing) ranked highest followed by System 2, 3 and 4 (Existing/Committed, Direct Cost and Expanded Blue Box) as second highest. Systems 5 and 6 (Wet/Dry and Mixed Waste Processing) ranked lowest.

10.2.6 Summary of Effects Analysis

The following summarizes the above effects by criteria and indicator for York Region. The system alternatives were first ranked by the criteria and indicators by the Municipal Finance group.

The highest ranked system is System 1 (Existing). The Existing system would have the least cost impact on the tax payers in York and does not present significant debt costs to the financial structure. System 2 (Existing/Committed) represents the second highest ranked. Systems 3A and 4 (Direct Cost [tax neutral] and Expanded Blue Box) are the third highest ranked systems. They impose a low cost per household and do not require significant capital costs. System 3B (Direct Cost [added tax]) imposes an additional cost to the tax payers which is unrelated to service received. This revenue, however, represents an addition to York Region's reserves, which are then available to assist in further waste management financing for other projects. As such, these added funds would be returned to tax payers in the future. It is for this reason that System 3B (Direct Cost [added tax]) ranked below System 3A (Direct Cost [tax neutral]) as third lowest.

Systems 6A and 6B (Mixed Waste Processing) are the lowest ranked because they carry the highest tax effects and the highest capital costs. The second lowest ranked system was System 5 (Wet/Dry) because of its impact on debt capacity and municipal reserves.

On the basis of the Municipal Finance criteria group, the York Region systems were ranked as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
3 - System 3A (Direct Cost [tax neutral])
3 - System 4 (Expanded Blue Box)
5 - System 3B (Direct Cost [added tax])
6 - System 5 (Wet/Dry)
7 - Systems 6 (A+B) (Mixed Waste Processing)

10.3 Natural Environment Criteria Group (York Region)

The system rankings for the three Natural Environment Criteria are discussed below. The system rankings, by criterion, are summarized in Table 10.3.

For the purpose of the systems evaluation with respect to the Natural Environment, Systems 6 (Mixed Waste Processing (A+B)) were considered to be the same. These system evaluations are combined and referred to as System 6.

10.3.1 Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential for loss or removal and disruption effects due to accidents was expected to be the same for all systems. Systems 1, 2 and 4 (Existing, Existing/Committed and Expanded Blue Box systems respectively) each require a new materials recovery facility resulting in similar potential effects to terrestrial systems and resources. Systems 1, 2 and 4 were considered to be the highest ranked systems.

System 3 (Direct Cost) and System 5 (Wet/Dry) both require the same new MRF as Systems 1, 2 and 4. However, additional effects are anticipated for System 3 due to a higher likelihood of illegal dumping of wastes occurring. System 5 requires a new in-vessel central compost facility. The potential effects and advantages/disadvantages for System 5 are expected to be similar to System 3, and thus both systems are ranked lowest.

System 6 (Mixed Waste Processing) requires a new MRF and a new Mixed Waste Processing and composting facility. Due to the area typically required for a mixed waste facility, System 6 is predicted to have the highest potential for effects to terrestrial systems and resources and is therefore ranked lowest.

TABLE 10.3

REGION OF YORK
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR NATURAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Natural Environment (Overall Ranking)	Highest ranked with Systems 2 and 4	Highest ranked with Systems 1 and 4	Second lowest ranked with System 5	Highest ranked with Systems 1 and 2	Second lowest ranked with System 3	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW collection days or mobile depot	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW collection days or mobile depot	Lowest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW collection days or mobile depot · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW collection days or mobile depot	Lowest ranked due to: · potential loss or removal effects due to siting of new MRF and new compost facility · potential loss or removal and disruption effects due to accidents at HHW collection days or mobile depot	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and new mixed waste processing and composting facility · potential loss or removal and disruption effects due to accidents at HHW collection days or mobile depot
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, and central compost facility	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, and central compost facility	Lowest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, and central compost facility · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, and central compost facility	Second Highest ranked due to: · potential disruption effects due to siting new MRF and compost facility · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, and central compost facility	Lowest ranked due to: · potential disruption effects due to siting MRF and mixed waste processing/composting facility · potential loss or removal and disruption effects due to discharges from HHW collection days and mobile depot, central compost facility and mixed waste facility

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 10.3

REGION OF YORK
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Criteria Group/Criteria	**System 1 Existing**	**System 2 Existing/Committed**	**System 3 Direct Cost**	**System 4 Expanded Blue Box**	**System 5 Wet/Dry**	**System 6 (A+B) Mixed Waste Processing**
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions may result from wet waste composting	Lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting facility

10.3.2 Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Similar to effects on terrestrial systems and resources, potential effects to aquatic systems were expected due to facility location, discharges from a facility and accidents. The largest potential for effects was expected to be as result of leachate or contaminated surface water runoff from HHW and central compost facilities. All systems were considered equal with respect to effects as a result of discharges from existing facilities.

Systems 1, 2 and 4 each have a new MRF. Siting this facility may result in some effects, but no additional discharges are expected. Systems 1, 2 and 4 were ranked equal and highest.

System 3 (Direct Cost), System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) include the same new MRF. The effects of a new MRF on aquatic systems are not expected to be significant since only dry recyclables are processed. However, these three systems have disadvantages associated with them. System 5 also requires a new in-vessel central compost facility for wet wastes and which also replaces the existing windrow compost facility. The likelihood of illegal dumping of wastes as a result of a Direct Cost system is expected to result in increased effects to aquatic systems and water resources. Compared to the Wet/Dry system, System 6 requires a new Mixed Waste Processing facility in addition to the new MRF. The potential effects on aquatic systems from this system were anticipated to be similar to those for System 3. The Wet/Dry system was ranked second highest, while Systems 3 and 6 were ranked equally as the lowest for all systems.

10.3.3 Potential Effects to the Atmospheric Environment

All six system alternatives were expected to have emissions to the atmosphere. These emissions include dust, bioaerosols, odours and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere are reduced by such measures as following proper operating procedures of the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. Systems 1, 2, 3 and 4 do not include the management of wet wastes or mixed wastes. These systems were all ranked highest. System 5 (Wet/Dry) was ranked lower than these systems due to

the disadvantage of the substantive quantity of wet waste composted. System 6 (Mixed Waste Processing) was ranked lowest due to the nature of the mixed wastes and the processing method being typically open to the surrounding atmosphere.

10.3.4 Overall System Ranking

When considering the ranking of systems by criterion and the criteria rankings together, an overall system ranking can be completed for the Natural Environment criteria group. System 1 (Existing), System 2 (Existing/Committed) and System 4 (Expanded Blue Box) were ranked highest for each of the three criteria. As a result, these systems were ranked highest overall.

System 3 (Direct Cost) and System 5 (Wet/Dry) were ranked second lowest of the systems. These systems require the same new MRF as Systems 1, 2 and 4. However, the Direct Cost system has a higher likelihood of illegal dumping of wastes, resulting in additional effects to terrestrial systems and aquatic systems. The Wet/Dry system also includes a new in-vessel central compost facility for wet wastes. It is expected to result in increased emissions to the atmosphere from wet waste composting. The effects and advantages/disadvantages of the two systems were considered to be equal, thus the same ranking.

System 6 had the most disadvantages and was ranked lowest for all three criteria. Consequently, System 6 was ranked lowest overall. This system required a new MRF and Mixed Waste Processing facility resulting in a higher potential for effects to terrestrial systems and aquatic systems. Potential effects to the atmospheric environment from Mixed Waste Processing were also considered to be greater than emissions from any of the other five systems.

The following summarizes the York Region system ranking from the perspective of the Natural Environment criteria group (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Commercial)
1 - System 4 (Expanded Blue Box)
4 - System 3 (Direct Cost)
4 - System 5 (Wet/Dry)
6 - Systems 6 (A+B) (Mixed Waste Processing)

10.4 Service Criteria Group (York Region)

The following discusses York Region system rankings for the Service criteria group which are presented in Table 10.4. System rankings are first discussed by criteria then for the overall criteria group. For the Service discipline, System 6 was evaluated as two potential scenarios, namely, System 6A - Mixed Waste Processing with low quality compost and 6B, Mixed Waste Processing with high quality compost. The distinction is crucial to the analysis because compost quality will determine whether the material is used (and for what) and whether it is disposed. This distinction reflects the ultimate waste diversion potential of the system(s) and must be considered in their evaluation.

10.4.1 Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system is dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology has been proven (specifically for the Region of York) and the systems are diverse, Systems 1 and 2 (Existing and Existing/Committed) were judged to be equal and ranked highest in terms of Reliability. Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively) were ranked equal, and second highest. System 3 (Direct Cost) is based on an approach that is proven, however, it is based (to a degree) on reliance on a single approach (economic incentive to encourage high participation in waste diversion systems). System 4 (Expanded Blue Box) is also based on proven technology and it relies extensively on public participation for its success. Also, some Region of York residents (in Markham) are presently participating in a partially expanded program which has been successful.

System 5 (Wet/Dry) is ranked second lowest as it relies on extensive public participation and while technology is proven it may be limited in its ability to include multi-family buildings. Some communities in York are pursuing Wet/Dry projects. Markham is currently conducting a pilot study of Wet/Dry collection systems, and both Newmarket and Richmond Hill have considered collection of household organics in the past.

TABLE 10.4

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Service (Overall Ranking)	**Second lowest**	**Third lowest**	**Second highest**	**Highest**	**Third highest**	**Lowest**	**Second Lowest**
Reliability	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Second highest due to: · technologies presently exist and are proven · success relies on economic incentive to increase voluntary source separation by single-family residents · relies also on integration of social approaches	Second highest due to: · technologies presently exist and are proven · relies on increased public participation achieved through extensive education and promotion · also relies on integration of several approaches	Second lowest due to: · technology proven at small scale in North America and at larger scale in Europe · Wet/Dry pilot project in progress in Markham · effect of failure is significant as handling of 3 streams are linked in one system. However not readily prone to failure · relies on increased public participation to effectively source separate residential waste into three streams · increased public participation achieved through extensive promotion/education	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 10.4

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest due to: · existing infrastructure handles limited range and quantity of materials · organic materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited	Lowest due to: · existing infrastructure handles limited range and quantity of materials · wet materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited but 3Rs Regulations require service (low % of multi-family dwellings means limited opportunity to increase diversion)	Second lowest due to: · existing infrastructure handles limited range and quantity of materials · very compatible with Existing/Committed system · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Third highest due to: · collects wider range and higher quantities of materials · compatible with and expands on Existing/Committed system · depends on homeowner for success · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Second highest due to: · collection of wider range and greater quantities of materials (including wet organic waste and others not captured in residential Blue Box programs) · new MRF and new centralized compost plant required to accommodate increased range and quantities of materials · requires fundamental change (modified source separation) to Existing system for residential participation (essential to success)	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality does not meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality unlikely to meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters
Performance	Lowest due to: · limited waste diversion of only 28% or up to 31% by the year 2000	Lowest due to: · limited waste diversion of only 29% or up to 32% by the year 2000	Second lowest due to: · waste diversion of 43% or up to 46% by the year 2000	Second lowest due to: · waste diversion of 44% or up to 47% by the year 2000	Second highest due to: · waste diversion of 57% or up to 60% by the year 2000 · significant diversion of food waste (75%)	Second highest due to: · waste diversion of 59% or up to 62% by the year 2000 · limited source separation may decrease marked value of secondary materials · significant diversion of food waste	Highest due to: · estimated ability to divert 77% to 80% waste by the year 2000 · limited source separation may decrease marked value of secondary materials · significant diversion of food waste

TABLE 10.4

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Third highest ranked due to: · maintains existing 3Rs participation as residents and municipalities are familiar with the requirements of the System · not likely to encourage greater individual action · some positive attitudes and perceptions toward 3Rs activities · residents likely willing to pay for the System (low tax increase)	Second highest ranked due to: · potential for minor positive increase in 3Rs participation because of increased opportunities (e.g., for multi-family residences) · generally positive attitudes and perceptions toward 3Rs activities · residents' willingness to pay increased costs of the System uncertain (moderate tax increase)	Highest ranked due to: · potential for greater participation through greater source separation of materials (financial incentive); increased composting opportunities; and, greater promotion and education · direct cost charges not implemented in most multi-family buildings; no additional incentives for these households · difficult to implement composting in multi-family housing and unlikely to significantly increase participation (low proportion of households in York) · uncertain of implementation of direct cost in rural, self haul areas · potential for public controversy · residents' willingness to pay increased costs of the System uncertain (moderate tax increase)	Highest ranked due to: · potential for greater participation through: greater source separation of more materials; increased composting opportunities; greater promotion and education; and, targeting of all housing types · positive attitudes and perceptions towards 3Rs activities because residents familiar with System requirements · residents' willingness to pay for the System uncertain (moderate tax increase)	Second lowest ranked due to: · potential for reduced participation because of: a variety of inconveniences from collection activities and odour and health concerns related to effects from food waste composting; limited application to high-rise residences; and, uncertain application to rural residences · potential for negative attitudes and perceptions to the System because of inconveniences and health concerns · people are unwilling, unable or lack knowledge to source separate properly, resulting in potential for contamination of dry stream · residents may be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)

Systems 6A and 6B (Mixed Waste Processing with high and low quality finished compost) were both ranked lowest because they are based on a technology that is widely used but still experiences technical problems. They also rely on a single approach for the "third bag" of waste.

10.4.2 Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporates the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished compost) were ranked highest because they can handle the full range and quantity of residential materials generated in Region of York. They were judged to be compatible with the existing collection system and to lead to significantly increased waste diversion.

System 5 (Wet/Dry) was ranked second highest as it collects a wider range and greater quantity of the dry materials that are not regularly collected in Blue Box programs. System 5 provides the capacity to divert significant quantities of wet household waste which cannot be diverted by Systems 1 to 4. This system therefore has greater flexibility than Systems 1 to 4.

System 4 (Expanded Blue Box) was ranked third highest. While it collects a wider range and quantity of dry materials and is compatible with the Existing/Committed System, in the Region of York projected quantities of materials collected are lower than in some systems. It does not have the flexibility to divert significant quantities of wet materials.

System 3 (Direct Cost) is ranked second lowest for flexibility. It is compatible with the Existing/Committed system but collects a narrower range of materials than Systems 4, 5 and 6. System 2 (Existing/Committed) is ranked lowest along with System 1 (Existing), because of the limited range and quantity of material that these systems divert when compared to Systems 3 to 6.

10.4.3 Performance

System performance was judged according to the amount of material diverted by each system, expressed as a percentage of the waste generated. For diversion estimates it was assumed that markets would exist for all recovered materials.

System 6B was ranked highest in terms of performance because it significantly increases the amount of material diverted (77% to 80% by the year 2000). System 6A (Mixed Waste Processing with low quality finished compost) was ranked second highest with potential to divert 59% to 62% of the residential waste stream. System 5 was also ranked second highest with potential to divert 57% to 60% of the residential waste stream.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) are both ranked second lowest with diversion potential of 43% to 46% (System 3) and 44% to 47% (System 4).

Systems 1 (Existing) and System 2 (Existing/Committed) are ranked lowest, due to the lower level of material diverted. These systems are both estimated to divert 28% to 31% and 29% to 32% of the residential waste stream respectively.

10.4.4 Social Acceptability

The social acceptability of each system in York Region was evaluated on the basis of the potential effects of the systems on participation, attitudes to and perception of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) and System 3 (Direct Cost) were ranked the highest for social acceptability.

System 4 was ranked highest because York Region residents and municipalities are familiar with the System components and the infrastructure, and can be expected to respond more quickly and more positively to the System. System 4 is also suitable for the low density areas of York. In addition, all apartment buildings of more than 6 units will be provided with recycling services, providing an improved level of service to these residents. This will likely encourage greater participation. However, the willingness of residents to pay the tax increase (a moderate impact) is uncertain but the increase is lower than for Systems 5 and 6 and the same as System 3.

System 3 (Direct Cost) was also ranked highest because it has the potential to encourage greater participation in 3Rs than System 1 (Existing) or System 2 (Existing/Committed) and System 4 (Expanded Blue Box). Potential problems in implementing Direct Cost in high-rise dwellings may not be significant in York due to the low proportion of multi-family households (about 11% of households). However, the willingness of residents to pay the tax increase, a moderate impact (equal to System 4), is uncertain. System 3 has the advantage over System 2 and System 4 of potentially encouraging greater participation by individuals and greater behavioural change to support 3Rs due to the economic

incentive. The Direct Cost System may be controversial (i.e., perception of being "double taxed").

System 2 (Existing/Committed) was ranked as the second highest because it has greater potential for positive attitudes and participation than System 1; it will not encounter the same potential public controversy as System 3; it does not have the same inconveniences as System 5 which reduce that System's participation; and, residents are more willing to pay for this System than for Systems 5 and 6.

System 1 was ranked third highest. While this System does not offer the range of 3Rs opportunities identified in the other systems, the costs are acceptable and the possibility of controversy around System components is negligible in comparison with the other systems.

System 5 (Wet/Dry) was ranked second lowest. It has an advantage over Systems 1, 2 and 6 because it has greater potential to encourage stronger positive attitudes and behaviour toward the 3Rs. However, the acceptability of System 5 for York Region residents could be significantly reduced due to odour and vermin effects from the volumes of food waste being composted at the composting facility. There is also increased potential for some groups to participate less due to greater difficulty in using the 90 gallon carts (e.g., elderly and disabled) and for others not to separate food waste (due to the messiness and inconveniences associated with the carts). In addition, the effectiveness of a Wet/Dry system in rural areas and apartments is uncertain. Most importantly, residents and municipalities will likely be unwilling to pay the significantly higher costs for System 5.

System 6 (Mixed Waste Processing) was ranked the lowest because: the System costs are likely to be unacceptable to residents and municipalities; it does not encourage source separation and could reduce individual participation in some of the components of the System (e.g., Blue Box); and, the mixed waste processing and composting facility may not be acceptable due to potential significant odour problems.

10.4.5 <u>Service Criteria Group - Overall System Ranking</u>

By considering the systems ranking by criteria and criteria rankings, an overall system ranking was completed for the Service criteria group. Any system that received a mix of a lowest and highest ranking for reliability and performance (the two top ranked criteria) were ruled out of contention as the highest ranked systems. The ultimate ranking of these systems were then evaluated using social acceptability and flexibility.

System 6B received the highest ranking for performance, but the lowest ranking for reliability. The same was true (in reverse) for Systems 1 and 2 (Existing and Existing/Committed) which received highest rankings for reliability and lowest for performance. The three systems were therefore eliminated from consideration as top-ranked systems.

The remaining Systems 3, 4, 5 and 6A were compared to determine the highest ranked system. System 4 (Expanded Blue Box) was ranked highest overall. System 4 was ranked similarly with Systems 3 (Direct Cost) and 5 (Wet/Dry) on the combined top two criteria (performance and reliability), with rankings of second lowest for performance (due to low diversion) and second highest for reliability (since an expanded list of materials is already in place in some areas and the system is proven). System 4 was considered more socially acceptable (ranked highest) than System 5 (ranked second lowest) since residents are familiar with the system and it is suitable to the low density character of York Region. It is also more flexible than System 3 because it provides opportunities to recycle a wide range of materials.

System 3 (Direct Cost) was ranked second highest overall. Like System 4, it was considered most socially acceptable, but with a slightly narrower range of materials collected, it was considered less flexible (and ranked second lowest for the criterion). System 5 (Wet/Dry) was considered less socially acceptable than Systems 3 and 4 (and was ranked second lowest) due to concerns about residents' willingness to pay higher taxes, potential difficulties of residents in using Wet/Dry carts and concerns about participation levels. Although it was considered more flexible (with a wider range of materials, including organics) than either Systems 3 or 4, System 5 was ranked third highest overall.

Systems 1 (Existing), 2 (Existing/Committed) and 6B (Mixed Waste Processing with high quality compost) each received a top and lowest ranking for performance and reliability. Systems 1 and 2 are considered very reliable but achieved the lowest diversion of all systems. System 6B is limited by its reliance on a technology that is widely used but still causes technical problems. It was therefore ranked lowest for reliability, although it achieved highest diversion of all systems. System 2 was considered more socially acceptable than most systems (ranked second highest) but was not considered very flexible and was ranked third lowest overall.

Systems 1 and 6B were not considered to be very socially acceptable. Because System 1 will not encourage significant participation it was ranked third highest for social acceptability while System 6B, which will impose a high tax increase and may cause odour and vermin problems was ranked lowest. System 6B was ranked highest for

flexibility, and System 1 was ranked lowest (with the narrowest range of materials collected). Because this criteria is considered of least importance, and taking into account the significant difference in diversion, the systems were considered to be equal, and ranked second lowest overall.

In comparison, System 6A was ranked lowest overall. It achieves lower diversion than System 6B and shows the same concerns about technology problems (reliability) and potential odour and vermin problems. It was therefore ranked lowest for both social acceptability and reliability. Although it was also considered most flexible (accepting a wide range of materials) this criterion is considered of least importance and it was ranked lowest overall.

In summary, the system ranking for York Region under the Service criteria grouping was (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - System 6B (Mixed Waste Processing [high quality compost])
6 - System 6A (Mixed Waste Processing [low quality compost])

10.5 Social Environment Criteria Group (York Region)

The system rankings for the three social environment criteria for discussed below. The system rankings, by criterion, are summarized in Table 10.5.

For the purpose of the systems evaluation for the social environment, Systems 6A and 6B were considered to be the same. These system evaluations were considered to be the same and are referred to as System 6 (Mixed Waste Processing).

TABLE 10.5

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Social Environment (Overall Ranking)	Lowest ranked	Second lowest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Second highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities · additional potential disruption effects from illegal dumping and burning	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to the new MRF and increased use of existing facilities	Second lowest ranked due to: · potential displacement effects due to new MRF and the new centralized composting facility for wet waste · potential for disruption effects due to new and existing facilities	Lowest ranked due to: · potential displacement effects due to the new MRF and new centralized mixed waste processing and composting facility · potential for disruption effects due to new and existing facilities
Potential for Broad Social Impact	Lowest ranked due to: · little or no potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second lowest ranked due to: · limited potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · potential for additional employment and economic development opportunities · potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for negative lifestyle effects associated with illegal dumping and burning	Highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · potential for additional employment and economic development opportunities · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting)	Second highest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but uncertain if the System will realize this potential or lead to reduced participation in source separation · potential for negative lifestyle effects related to inconveniences (associated with wet/dry carts) · potential for additional employment and economic development opportunities	Second lowest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but may result in reduced household source separation and contamination of the recyclable stream · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for additional employment and economic development opportunities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 10.5

YORK REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Third highest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) but limited by lack of application to multi-family housing · limited potential for negative distributional effects from facilities · potential for negative distributional effects on low income groups	Highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) · limited potential for negative distributional effects from facilities	Second highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting), although application to multi-family housing is limited · potential for negative distributional effects due to facilities	Second lowest ranked due to: · potential positive benefit to future generation from highest volumes of waste diverted, but potential for negative effect on future 3Rs behaviour from reduced participation in source separation · potentially equitable distributional effects as 3Rs opportunities targeted to all housing types · potential for negative distributional effects due to facilities

10.5.1 Potential Local Community Impacts

Potential Local Community Impacts can be anticipated in York Region as a result of siting new 3Rs facilities and from the expansion and increased use of existing facilities. However, the potential effects from expanded use of existing facilities were taken to be the same for System 1 (Existing), System 2 (Existing/Committed), System 3 (Direct Cost) and System 4 (Expanded Blue Box) and did not lead to one system being ranked over another for this potential effect.

Systems 1 (Existing), 2 (Existing/Committed) and 4 (Expanded Blue Box) were all ranked highest because they require the same existing facilities and a new MRF. System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) require other additional facilities with potentially more significant local community impacts.

System 3 (Direct Cost) was ranked second highest. Although it has the same facilities as Systems 1, 2 and 4, with the same types of effects as these Systems, there is the potential for additional disruption effects from illegal dumping and burning. Although the significance of the effects is uncertain, the magnitude of illegal dumping may create local community impacts in York Region greater than Systems 1, 2 and 4.

System 5 (Wet/Dry) was ranked second lowest because of displacement and disruption effects due to siting and operating the centralized Wet/Dry composting facility. Effects are also predicted due to the increased volume of all types of materials and the addition of food waste to the composting stream. The health and odour issues associated with the composting facility may be more significant than with Systems 1-4. Although the existing leaf and yard waste facilities would be closed, the effects from the new facility have the potential to be more significant for local communities.

System 6 (Mixed Waste Processing) was ranked the lowest because the displacement and disruption effects on residents, special/sensitive groups, community features and businesses and the community associated with a mixed waste processing and composting facility, along with the effects of the MRF and composting facilities of Systems 1-4, are expected to be more significant than the effects associated with the other systems.

10.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social effects on the Region's broad social environment in terms of the lifestyle of people, and the direct employment and economic development opportunities. An important consideration

in lifestyle change is the level of personal involvement in the management of the household waste; the greater the personal involvement, the more beneficial the lifestyle is taken to be for reducing, reusing and recycling waste.

System 4 (Expanded Blue Box) was ranked highest because it is a continuation of current lifestyles to support 3Rs and is familiar to residents. This should encourage them to separate a greater number of materials, more frequently and with less error than the other systems. It is easily implemented and suitable to the low density character of York Region. System 4 also has greater potential for additional minor direct employment and economic development opportunities than Systems 1, 2, 3 and 5. Systems 1 and 2 do not provide as many 3Rs opportunities to as great a number of people.

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked as the second highest systems. System 3 should encourage additional change to a lifestyle (through an economic incentive to households) that incorporates higher levels of personal involvement by residents in the management of their wastes. However, in System 3 there is a greater potential for some residents to engage in illegal dumping and burning to reduce the amount of waste for which they have to pay. This disadvantage is off-set by the potential to provide greater incentives to undertake source separation than System 5. And, it is uncertain how Systems 3 and 5 will encourage higher levels of personal involvement in apartment buildings (a low proportion of households in York Region) and rural areas which make up about 20 percent of residents.

Both Systems 3 and 5 will increase the opportunities for direct employment and economic development over Systems 1 and 2. However, it is uncertain if System 5 will achieve a change in lifestyle in York Region that incorporates personal involvement in the management of waste. The opportunity still exists for residents to not separate their recyclables and compostables, but instead to put them into the garbage stream. In addition, System 5 (Wet/Dry) is likely to have greater potential inconveniences for special/sensitive groups (e.g., elderly and disabled) due to the requirement for all people to use 90 gallon carts for their waste and separated materials.

Systems 2 (Existing/Committed) and 6 (Mixed Waste Processing) were ranked second lowest. System 6, along with System 4, has the greatest potential for direct employment and economic development opportunities, but it may not continue the change in lifestyle to support 3Rs behaviour and may not support further development of the 3Rs (residents will have the option of placing all their waste in the garbage stream). System 2 has limited potential for increased direct employment and economic development opportunities. It is more convenient than Systems 3-6, but has limited support to continue

change in lifestyle to more personal involvement in waste management compared to those systems.

System 1 (Existing) was ranked the lowest because it has limited support for a change in lifestyle to greater personal involvement of residents in managing their wastes and limited potential for a positive increase in direct employment and economic development opportunities.

10.5.3 Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups in York Region and as a result of effects on future generations. System 4 (Expanded Blue Box) was ranked the highest due to its overall positive effects on current and future generations. System 4 provides 3Rs opportunities to more people than Systems 1 and 2 and provides more equitable distribution of 3Rs opportunities among housing types by providing additional opportunities to multi-family households. It continues the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1, 2 and 6. It also has fewer negative distribution effects from facilities than Systems 5 and 6.

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked equally as the second highest. Systems 3 and 5 improve the distribution of 3Rs opportunities over Systems 1 and 2 by providing the opportunity to participate in 3Rs activities to a higher proportion of households. System 3 has the potential for greater benefit to future generations than Systems 1, 2 and 6. The economic incentive should encourage a change in behaviour to support greater reduction, reuse and recycling which should lead to greater conservation of the environment and a reduction in the management of the current generation's waste by the future. System 3 has potential for a negative distributional effect by increasing the financial burden on low income households. System 5 has a somewhat greater potential for negative distributional effects of new facilities than Systems 1-4. For both Systems the magnitude of effect on future generations is uncertain, but is likely to have greater potential for positive effect than Systems 1, 2 and 6.

System 2 (Existing/Committed) was ranked as the third highest. System 2 has the second least positive effect on future generations, the second least negative distribution effects from facilities and the second least positive distribution effects from the distribution of 3Rs opportunities.

System 6 (Mixed Waste Processing) is ranked second lowest for a number of reasons. There is the uncertainty of the benefit to future generations through the recovery of more recyclable material from the waste stream with the possibility of influencing behaviour away from the 3Rs. The potential for positive benefit to future generations is therefore less than for the other systems. System 6 has potentially the most significant negative facility distributional effects on some York residents from the operation of the mixed waste processing and composting facility. However, System 6 potentially provides the most equitable distribution of 3Rs opportunities of all the systems, because it is targeted to all housing types.

System 1 (Existing) was ranked the lowest because it is likely to have lower positive distributional effects on future generations than Systems 2-5 by not encouraging as significant a change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also does not provide as great an improvement in the distribution of 3Rs opportunities to residents as the other systems. However, it has the least negative distribution effects due to facilities.

10.5.4 Overall System Ranking

System 4 (Expanded Blue Box) was ranked as the highest system overall. It was ranked the highest for all three criteria.

System 3 (Direct Cost) was ranked second highest overall based on its second highest ranking for all three criteria.

System 5 (Wet/Dry) was ranked third highest on the basis that it was the second highest for both the Distribution of Social Costs and Benefits and Broad Social Impact criteria. It ranked as the second lowest for Potential Local Community Impact. The only significant difference between System 5 and 3 is that for Potential Local Community Impact, System 5 has the additional effects of the new centralized Wet/Dry composting facility.

System 2 (Existing/Committed) was ranked second lowest overall. System 2 was ranked below System 5 (Wet/Dry) because, although it ranked highest on Potential Local Community Impacts (due to same new facilities as Systems 1, 3 and 4), it ranked lower than System 5 for the other two criteria.

Systems 1 (Existing) and 6 (Mixed Waste Processing) were ranked the lowest. Due to some of the uncertainties involved in the analysis for each criterion, a judgement could not be made on which of these two Systems was better than the other. System 1 ranked

as the lowest for Broad Social Impact and Distribution of Social Costs and Benefits, with this disadvantage being off-set by the highest ranking for Potential Local Community Impact. System 6 was ranked the lowest for Potential Local Community Impacts and second lowest for both Potential for Broad Social Impact and Distribution of Social Costs and Benefits.

On the basis of the Social criteria group, the York Region systems were ranked as follows (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - Systems 6 (A+B) (Mixed Waste Processing)

11.0 REGION OF PEEL RESIDENTIAL SYSTEMS EVALUATION

The following provides a summary of the residential 3Rs systems evaluation and ranking for Peel Region.

11.1 Cost Criteria Group (Peel Region)

The following discusses system evaluation for the Cost criteria group. The Cost criteria group contains only one criterion, which is the cost per household for the waste management system (diversion and disposal). The criterion was based on the costs of the waste diversion system and the waste disposal system (in $/year), using 1992 dollars and dividing the sum of the costs by the total number of households in each Region. It is estimated for all systems using 1992 waste quantity estimates and unit rates.

11.1.1 Cost Criteria Group - Overall System Ranking

Table 11.1 presents a comparative evaluation of residential systems and overall system ranking for Region of Peel based on total system cost per household per year (diversion plus disposal) in the year 2000. The system ranking is discussed below.

Systems 1 to 4 ranked equally as highest, with system costs (measured as costs/household/year) in the $126 to $136/household/year range at a disposal cost of $50/tonne. System 5 (Wet/Dry) was ranked second highest, with system costs (diversion plus disposal) of $157 to $188/household/year at disposal rates of $50/tonne and $100/tonne respectively. System 6, Mixed Waste Processing, was ranked lowest, with an overall system costs of $203 to $219/household/year, if the Mixed Waste Processing system produces a high quality compost, and $206 to $235/household/year if the compost quality does not meet MOEE compost quality guidelines (i.e. greater quantities of material from the mixed waste plant are landfilled due to product quality limitations).

TABLE 11.1

PEEL REGION
NET EFFECTS SUMMARY FOR COST

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Second highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $126-178/hh/yr	Highest ranked due to: · $129-177/hh/yr	Highest ranked due to: · $133-174/hh/yr	Highest ranked due to: · $136-175/hh/yr	Second highest ranked due to: · $157-188/hh/yr	Lowest ranked due to: · $206-235/hh/yr	Lowest ranked due to: · $203-219/hh/yr

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

In summary, system ranking for the Cost criteria group is as follows (highest to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
5 - System 5 (Wet/Dry)
6 - System 6B (Mixed Waste Processing [high quality compost])
6 - System 6A (Mixed Waste Processing [low quality compost])

11.2 Municipal Finance Criteria Group (Peel Region)

The following describes Peel Region's system rankings for the Municipal Finance criteria group. The individual system rankings are presented first by criteria, and are followed by the overall criteria group rankings.

Table 11.2 summarizes the municipal finance system rankings.

11.2.1 Potential Impact on Local Taxpayers

The following describes the system net effects on the local taxpayers. When all elements are considered, gross costs in Peel Region may range from $9.5 million per year for System 1 (Existing) to $72.8 million per year for Systems 6A and 6B (Mixed Waste Processing). Further, while System 2 (Existing/Committed) may present a gross annual operating cost of $17.4 million per year, System 3A (Direct Cost [tax neutral]) may approach $24.0 million per year, with System 3B (Direct Cost [added tax]) approaching $47.3 million in annual levy costs.

The household cost of diversion may also be compared to the level of municipal taxation paid in Peel Region. In 1992, diversion activities represented $20.00 per household, or 1.5% of total municipal taxes of $1,337.00 per household per year (excluding school taxes). To estimate the future effects of an increasing tax base on the diversion alternatives the analysis included household growth estimates for Peel.

TABLE 11.2

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR MUNICIPAL FINANCE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (tax neutral)	System 3B Direct Cost (added tax)	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Third Highest ranked	Third Lowest ranked	Third Highest ranked	Second Lowest ranked	Lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Second Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 9,508,916	· 17,454,659	· 24,055,153	· 47,355,153	· 25,757,175	· 31,904,990	· 65,491,412	· 72,801,398
· Tax per household ($)	· 25	· 41	· 54	· 129	· 57	· 70	· 137	· 152
· Share of taxation (%)	· 2%	· 6%	· 8%	· 14%	· 8%	· 10%	· 18%	· 20%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Third highest ranked due to:	Third highest ranked due to:	Second Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 13,144,000	· 43,510,000	· 51,465,000	· 51,465,000	· 53,365,000	· 107,965,000	· 154,965,000	· 154,965,000
· Debt payments ($)	· 2,048,000	· 6,780,000	· 8,019,000	· 8,315,000	· 8,315,000	· 16,823,000	· 24,147,000	· 24,147,000
· Debt capacity (%)	· 77%	· 72%	· 71%	· 71%	· 71%	· 63%	· 56%	· 56%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 23,300,000	· 0	· 0	· 0	· 0
· Reserves/ household($)	· 0	· 0	· 0	· 75.34	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 92%	· 92%	· 92%	· 94%	· 92%	· 92%	· 92%	· 92%
Impact on Municipal Level of Service	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Operating cost ($)	· 9,508,916	· 17,454,659	· 24,055,153	· 24,055,153	· 25,757,175	· 31,904,990	· 65,491,412	· 72,801,398
· Percent Increase (%)	· 1%	· 2%	· 3%	· 3%	· 3%	· 4%	· 7%	· 8%
Impact on Private Sector Industries	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Costs ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Higher prices ($)	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e	· n/e
· Share of private taxes (%)	· 2%	· 3%	· 5%	· 5%	· 5%	· 6%	· 13%	· 14%
n/e -- no effect on residential systems								

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

Household costs range between $25.00 and $152.00 for the various alternatives. System 2 (Existing/Committed) ($41.00) represents from 4% to 6% of household taxes and has a medium effect on taxation. Further, Systems 3, 4, 5 and 6 (Direct Cost, Expanded Blue Box, Wet/Dry and Mixed Waste Processing) represent a share of above 7% of current average household taxes and therefore have the highest effects.

To estimate the effect of the system, a share of taxation guideline was utilized. For example, if taxation specifically related to diversion ranged from 0% to 3% of household taxes, it was considered to have a low effect, while a share of 4% to 6% was considered to have a medium effect, and a share of above 7% was considered to be high. It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

System 1 (Existing) ranked highest followed by the System 2 (Existing/Committed) as second highest. All other systems ranked lowest.

11.2.2 Potential Impact on the Debt Burden of the Municipalities

All of the alternative systems significantly affect Peel Region's associated debt burden. Relatively, Systems 2, 3, and 4 (Existing/Committed, Direct Cost and Expanded Blue Box) have lower capital requirements and therefore Peel's debt burden is affected the least at increases between 30 and 36% in these alternatives. Further, since the Existing system requires additional debt only to provide existing service levels it is the lowest capital cost system and highest ranked. Systems 6A and 6B (Mixed Waste Processing) represent the highest capital costs and are the lowest ranked systems.

An examination of Peel Region's existing debt charge position, that is, the comparison of debt payments (including principal and interest) to operating expenditures, debt charges represented 4.3% of costs. The future diversion alternatives have the effect of changing these ratios for all systems. With Systems 2, 3 and 4 (Existing/Committed, Direct Cost and Expanded Blue Box), the ratio of debt charges to expenditures may increase to between 5.1 and 5.2%. With Systems 5 and 6 (Wet/Dry and Mixed Waste Processing), debt charges may increase to 6.2 and 7.0% respectively.

Debt capacity calculations (the ratio of debt charges to operating expenditures) determine the amount of available debt permitted by the Ministry of Municipal Affairs (former OMB guideline). When estimating debt capacity, using a 9% interest rate and a 10 year term, the total debt capacity for Peel Region approaches $687.1 million. System 6 absorbs the largest amount of debt capacity, leaving Peel with 56% of its debt capacity. System 5 (Wet/Dry) leaves Peel with 63% of its debt capacity while Systems 5 and 4 (Direct Cost and Expanded Blue Box) 71% of capacity.

On an overall basis, when all of the debt factors are taken together, System 1 (Existing) represents the highest ranked system as it carries the least cost in terms of capital. On the other hand, Systems 6A and 6B (Mixed Waste Processing) are the lowest ranked systems since they incur the highest capital costs. All other systems are ranked in between these systems because they carry high capital costs but affect Peel's financing to a lesser extent.

11.2.3 Potential Impact on Municipal Reserve Funds

It was shown under the system descriptions that System 3B (Direct Cost [added tax]) had the capacity of generating a $23.3 million in extra revenue that could be placed into reserves and used for other waste management/waste diversion activities. The cost to the household would approximate $75.34. Further, the $23.3 million in additional taxation represents approximately 94% of annual operating expenditures.

As a result of this, System 3B is the highest ranked since it adds to the Region's reserve fund position. Conversely, all other systems are the lowest ranked systems because they do not impact the reserve fund.

11.2.4 Potential Impact on the Level of Municipal Services

To estimate the effect of each system, the relative level of annual diversion costs was compared to total operating expenditures. In this way, decreases in the level of service resulting from cost increases due to diversion can be captured. Cost increases that ranged from 0% to 3% of expenditures were considered to have a low effect. Cost increases of 4% to 6% were considered to have a medium effect and cost increases above 7% were considered to be high.

Systems 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost and Expanded Blue Box) would all have a low effect on municipal service levels. Conversely, Systems 6 (Mixed Waste Processing) would have a high effect on municipal service levels. As a result of the operating costs, System 5 (Wet/Dry) would have a medium effect on municipal service levels. However, it should be noted that Peel Region has the discretion to use reserve funds to offset the impact of any of the alternatives put forth to soften the effects of any of the alternatives.

As a result, Systems 1 and 2 (Existing and Existing/Committed) systems ranked highest. Systems 3 and 4 (Direct Cost and Expanded Blue Box) ranked second highest, followed by System 5 (Wet/Dry). Systems 6 (Mixed Waste Processing) ranked lowest.

11.2.5 Potential Impact on Private Sector Industries

Taxes currently collected from the business sector now approach $149 million. The tax share for each system ranged from 2% for System 1 (Existing); 3% for System 2 (Existing/Committed); 5% for both System 3 (Direct Cost [added tax bag charges are only residentially related]) and System 4 (Expanded Blue Box); 6% for System 5 (Wet/Dry); 13% for System 6A (Mixed Waste Processing [low quality compost]) and 14% for System 6B (Mixed Waste Processing [high quality compost]). It should be noted that a percentage increase in the share of taxes relates directly to an increase in taxes.

As a result, Systems 1 and 2 (Existing and Existing/Committed) are the highest ranked. Systems 3, 4 and 5 (Direct Cost, Expanded Blue Box and Wet/Dry) are the second highest ranked. Systems 6A and 6B (Mixed Waste Processing) are lowest ranked.

11.2.6 Summary of Effects Analysis

The following summarizes the above effects by criteria and indicator for Peel Region.

System 1 (Existing) is highest ranked. The Existing system represents the least cost to the taxpayers in Peel and does not present significant debt costs to the financial structure. System 2 (Existing/Committed) is the second highest ranked system as it has a medium effect on taxes and does not present significant debt costs to the financial structure. Systems 3A and 4 (Direct Cost [tax neutral] and Expanded Blue Box) have similar tax effects and both ranked third highest. System 3B (Direct Cost [added tax]) imposes an additional cost to the tax payers which is unrelated to service received. This revenue, however, represents an addition to Peel Region's reserves, which are then available to assist in further waste management financing for other projects. As such, these added funds would be returned to Peel's tax payers in the future. It is for this reason that the Direct Cost/added tax system ranked below the Direct Cost/tax neutral system as third lowest.

Systems 6A and 6B (Mixed Waste Processing) is the lowest ranked because it represents the highest tax effects and also the highest capital cost. Similarly, while less burdensome in terms of the tax effect, System 5 (Wet/Dry) represents the second lowest ranked system.

The following summarizes the Peel Region system rankings with respect to the Municipal Finance criteria group (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
3 - System 3A (Direct Cost [tax neutral])
3 - System 4 (Expanded Blue Box)

5 - System 3B (Direct Cost [added tax])
6 - System 5 (Wet Dry)
7 - System 6 (A+B) (Mixed Waste Processing)

11.3 Natural Environment Criteria Group (Peel Region)

The system rankings for the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 11.3.

For the purpose of the system evaluation with respect to the natural environment, Systems 6A and 6B were considered to be the same. These system evaluations was combined and referred to as System 6.

11.3.1 Ranking of Systems by Criterion

In order to identify a ranking of the 3Rs systems for the Region of Peel, the six system alternatives were first ranked by criterion within the Natural Environment criteria group. The systems rankings by criterion were based on the "system net effects by criterion" and "advantages/disadvantages by criterion" documented in the individual system net effects tables for Peel Region contained in Schedule D. The system rankings for the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 11.3.

For the purpose of the systems evaluation with respect to the natural environment, Systems 6A and 6B were considered to be the same. These system evaluations are combined and referred to as System 6.

11.3.2 Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential effects due to accidents was expected to be the same for all systems. System 1 (Existing), System 2 (Existing/ Committed) and System 4 (Expanded Blue Box) require an additional facility to those which already exist. Each of these systems requires a new MRF. It is expected that potential effects to terrestrial systems and resources can be effectively mitigated. This includes the siting of this new facility in an area with compatible land uses (i.e. industrial zoned areas). These three systems were ranked equal and highest overall. System 3 (Direct Cost) requires the same new facility as Systems 1, 2 and 4. However, the disadvantage of the Direct Cost system is a higher likelihood of illegal dumping of wastes occurring, making it lower ranked. The potential effects of illegal dumping are expected

TABLE 11.3

REGION OF PEEL
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
Natural Environment (Overall Ranking)	Highest ranked with Systems 2 and 4	Highest ranked with Systems 1 and 4	Second lowest ranked with System 5	Highest ranked with Systems 1 and 2	Second lowest ranked with System 3	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW depot	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW depot	Lowest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects are due to accidents at HHW depot · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential loss or removal effects due to siting new MRF · potential loss or removal and disruption effects due to accidents at HHW depot	Lowest ranked due to: · potential loss or removal effects due to siting of new MRF and new compost facility · potential loss or removal and disruption effects due to accidents at HHW depot	Lowest ranked due to: · potential loss or removal effects due to siting new MRF and mixed waste processing and composting facility · potential loss or removal and disruption effects due to accidents at HHW depot
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW depot and central compost facilities	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW depot and central compost facilities	Lowest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW depot and central compost facilities · potential disruption effects due to illegal dumping of wastes	Highest ranked due to: · potential disruption effects due to siting new MRF · potential loss or removal and disruption effects due to discharges from HHW depot and central compost facilities	Second Highest ranked due to: · potential disruption effects due to siting new MRF and compost facility · potential loss or removal and disruption effects due to discharges from HHW depot and new central compost facility	Lowest ranked due to: · potential disruption effects due to siting MRF and mixed waste processing/composting facility · potential loss or removal and disruption effects due to discharges from HHW depot, central compost facilities and new mixed waste facility

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 11.3

REGION OF PEEL
RESIDENTIAL SYSTEM RANKING
SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions may result from wet waste composting	Lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting facility

to be comparable to the effects and disadvantages associated with the siting of an additional facility in Systems 5 and 6. Systems 5 and 6 were ranked equal with System 3 and lowest overall. System 5 (Wet/Dry) requires a new in-vessel central compost facility in addition to the new MRF identified for the other systems. System 6 requires a new Mixed Waste Processing and compost facility, in addition to the new MRF required by the other systems. These systems were predicted to have the highest potential for the loss/removal or disruption of terrestrial systems and resources.

11.3.3 Potential for Effects to Aquatic Systems <u>Including Surface and Ground Water Resources</u>

Potential effects to aquatic systems were expected to occur for reasons similar to effects on terrestrial systems and resources (i.e. location of facility, discharges from the facility, accidents). However, additional effects to aquatic systems may occur due to discharges from 3Rs facilities. These discharges are expected to be in the form of leachate or contaminated surface water runoff from HHW and central compost facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all systems. Systems 1, 2 and 4 were ranked equal and highest. These systems all require a new MRF. The potential effects from this facility are expected to be minimal since the MRF will process only dry recyclables. System 5 (Wet/Dry) is ranked second highest as it requires both a new MRF and an in-vessel central compost facility. Effects from additional discharges from this compost facility may occur and is a disadvantage of the system. System 3 (Direct Cost) also requires the new MRF but it is anticipated that illegal dumping of wastes will occur as a result of this system. This dumping of wastes and its potential effects on aquatic systems make it ranked lowest along with System 6. A new MRF and Mixed Waste Processing and composting facility are part of System 6. The potential effects on aquatic systems and resources from these new facilities were expected to be greater than the other systems.

11.3.4 <u>Potential Effects to the Atmospheric Environment</u>

All six alternatives were expected to have emissions to the atmosphere. These emissions include dust, odours, bioaerosols and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere are reduced by such measures as following proper operating procedures of the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or

composted at centralized facilities in large volumes. Systems 1 to 4 do not include the management of wet waste or mixed waste and the associated disadvantages. These four systems were ranked equal and highest. System 5 includes the composting of wet waste while System 6 includes Mixed Waste Processing and composting. Due to the different nature of the two processes, with the wet waste composting to be done using in-vessel technology and Mixed Waste Processing and composting typically being open to the atmosphere (i.e. windrow technology), the potential effects of System 6 were considered to be the greatest and the system was ranked lowest.

11.3.5 Overall System Ranking

By considering the ranking of systems by criterion and the criteria rankings together, an overall system ranking can be completed for the Natural Environment criteria group. The Existing, Existing/Committed and Expanded Blue Box systems were ranked highest for each of the three criteria. As a result, these systems were ranked highest overall for the Natural Environment criteria group. The Direct Cost system, although requiring the same new 3Rs facility and having the same potential effects, was ranked lower than these systems. The potential effects on terrestrial systems and aquatic systems from illegal dumping of wastes were disadvantages which resulted in the lower ranking. The Wet/Dry system was ranked second lowest with the Direct Cost system having less potential effects on aquatic systems but greater potential effects to the atmospheric environment.

System 6 (Mixed Waste Processing) was the lowest ranked system for all three criteria. System 6 was ranked the lowest system overall. Potential effects to the atmospheric environment and to aquatic systems from System 6 were considered to be greater disadvantages than those identified for Systems 3 and 5.

The overall system ranking for the Natural Environment criteria group is as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 4 (Expanded Blue Box)
4 - System 3 (Direct Cost)
4 - System 5 (Wet/Dry)
6 - System 6 (Mixed Waste Processing)

11.4 Service Criteria Group (Peel Region)

The following discusses Peel Region system rankings for the Service criteria group which are presented in Table 11.4. System rankings are first discussed by criteria then for the overall criteria group. For the Service discipline, System 6 was evaluated as two potential scenarios, namely, System 6A - Mixed Waste Processing with low quality compost and 6B, Mixed Waste Processing with high quality compost. The distinction is crucial to the analysis because compost quality will determine whether the material is used (and for what) and whether it is disposed. This distinction reflects in the ultimate waste diversion potential of the system(s) and must be considered in their evaluation.

11.4.1 Reliability

Since the technology has been proven (specifically for the Region of Peel) and the systems are diverse, Systems 1 and 2 (Existing and Existing/Committed) were ranked equal and highest for reliability.

Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively) were equal, and second highest. System 3 (Direct Cost) is based on a proven approach however it is also based, to a degree, on reliance on a single approach (i.e. economic incentives to increase voluntary source separation by residents). System 4 (Expanded Blue Box) is also based on proven technology. Peel residents are presently participating in a partially expanded program which has been successful. However, it also relies extensively on a single approach (public participation) for its success.

The City of Mississauga has been a demonstration site for a Wet/Dry collection pilot project for some time, and has evaluated a number of methods of collecting household waste in both two and three streams. In addition, the Region of Peel is still considering the possibility of constructing a central composting facility, possibly to be shared with Region of Halton.

System 5 (Wet/Dry) is ranked second lowest because while technology is proven in smaller Canadian communities (e.g. Gold River, British Columbia), it has not been implemented in an area as large as Region of Peel. It may also be limited in its ability to include multi-family buildings. Because multi-family units make up a reasonable proportion of Peel's housing stock (27.4%), this is considered a limitation of the system.

TABLE 11.4

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Service (Overall Ranking)	**Second lowest**	**Second highest**	**Second highest**	**Highest**	**Third highest**	**Lowest**	**Second Lowest**
Reliability	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Highest due to: · technologies presently exist and are proven · system is not prone to failure by relying on single approach · relies on integration of several approaches · relies on willingness of residents to participate	Second highest due to: · technologies presently exist and are proven · success relies on economic incentive to increase voluntary source separation by single-family residents · relies also on integration of social approaches	Second highest due to: · technologies presently exist and are proven · Peel residents presently participating in successful partially · relies on increased public participation achieved through extensive education and promotion · also relies on integration of several approaches	Second lowest due to: · some Peel residents participated in a Wet/Dry pilot project · technology proven at small scale in North America and at larger scale in Europe · effect of failure is significant as handling of 3 streams are linked in one system. However not readily prone to failure · relies on increased public participation to effectively source separate residential waste into three streams · increased public participation achieved through extensive promotion/education	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation	Lowest due to: · technology widely used but experiences on-going operating problems · relies on processing of third bag of waste · secondary materials recovered from Mixed Waste Processing and composting plant likely to be of lower quality · approach does not encourage additional source separation

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 11.4

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest due to: · existing infrastructure handles limited range and quantity of materials · organic materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited	Second lowest due to: · existing infrastructure handles limited range and quantity of materials · wet materials diverted through either separate leaf and yard waste collection or limited distribution of backyard composters · very limited flexibility for diversion of food waste · ability to divert waste from multi-family homes limited but 3Rs Regulations require service · new recycling centres provide additional opportunity to divert/re-sue range of materials · partially expanded range of materials will be maintained	Third lowest due to: · existing infrastructure handles limited range and quantity of materials · very compatible with Existing/Committed system · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Third highest due to: · collects wider range and higher quantities of materials · compatible with and expands on Existing/Committed system · depends on homeowner for success · wet materials diverted through either separate leaf and yard waste collection or extensive distribution of backyard composters · limited flexibility for distribution of food but enhanced by extensive distribution/promotion of backyard composters and on-site composting in multi-family buildings · ability to divert waste from multi-family homes limited but 3Rs Regulations require service	Second highest due to: · collection of wider range and greater quantities of materials (including wet organic waste and others not captured in residential Blue Box programs) · new MRF and new centralized compost plant required to accommodate increased range and quantities of materials · requires fundamental change (modified source separation) to Existing system for residential participation (essential to success)	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality does not meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters	Highest due to: · ability to handle full range of wastes generated · provides ability to divert both wet organic and dry wastes · very compatible with existing collection system · can divert more multi-family waste than other systems · compost quality unlikely to meet Ontario guidelines for unrestricted use · additional organic materials diverted through backyard composters
Performance	Lowest due to: · limited waste diversion of 19% to 22% by the year 2000	Second lowest due to: · limited waste diversion of 25% to 28% by the year 2000	Third lowest due to: · estimated waste diversion of 37% to 40% by the year 2000	Third lowest due to: · estimated waste diversion of 38% to 41% by the year 2000	Second highest due to: · estimated waste diversion of 51% to 54% by the year 2000 · significant diversion of food waste (69%)	Second highest due to: · estimated waste diversion 55% to 58% by the year 2000 · limited source separation may decrease marked value of secondary materials · significant diversion of food waste	Highest due to: · estimated waste diversion of 74% to 77% by the year 2000 · significant diversion of food waste · limited source separation may decrease marked value of secondary materials · significant diversion of food waste

TABLE 11.4

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Highest ranked due to: · maintains existing 3Rs participation as residents and municipalities are familiar with the requirements of the System · not likely to encourage greater individual action · some positive attitudes and perceptions toward 3Rs activities · residents likely willing to pay for the System (low tax increase)	Highest ranked due to: · potential for minor positive increase in 3Rs participation because of increased opportunities (e.g., for multi-family residences) · generally positive attitudes and perceptions toward 3Rs activities · residents may be unwilling to pay increased costs of the System uncertain (moderate to high tax increase)	Second highest ranked due to: · potential for greater participation through greater source separation of materials (financial incentive); increased composting opportunities; and, greater promotion and education · direct cost charges not implemented in most multi-family buildings; no additional incentives for these households · difficult to implement composting in multi-family housing and unlikely to significantly increase participation (significant proportion of households in Peel) · uncertain of implementation of direct cost in rural, self haul areas · potential for public controversy · residents' likely to be unwilling to pay for the System (high tax increase)	Highest ranked due to: · potential for greater participation through: greater source separation of more materials; increased composting opportunities; greater promotion and education; and, targeting of all housing types · positive attitudes and perceptions towards 3Rs activities because residents familiar with System requirements · residents likely to be unwilling to pay for the System (high tax increase)	Second lowest ranked due to: · potential for reduced participation because of: a variety of inconveniences from collection activities and odour and health concerns related to effects from food waste composting; limited application to high-rise residences; and, uncertain application to rural residences · potential for negative attitudes and perceptions to the System because of inconveniences and health concerns · people are unwilling, unable or lack knowledge to source separate properly, resulting in potential for contamination of dry stream · residents likely to be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)	Lowest ranked due to: · potential for reduced participation because System does not encourage source separation; it could reduce participation in Blue Box and household composting activities · people are unable, unwilling or lack knowledge to source separate properly, resulting in potential for high contamination of recyclables · potential for negative attitudes and perceptions toward 3Rs as the mixed waste processing and composting facility may be unacceptable to residents · residents likely to be unwilling to pay for the System (high tax increase)

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished compost) were ranked equally and lowest because they are based on a technology that is widely used but still experiences technical problems. Systems 6A and 6B rely on a single approach for the "third bag" of waste. A Mixed Waste Processing and composting system had been proposed for "third bag" waste from Peel and possibly Halton by St. Lawrence Cement but the project was cancelled in September 1992, when incineration of municipal solid waste was banned in Ontario.

11.4.2 Flexibility

System flexibility was judged according to the types and quantities of waste and compatibility with the Existing system. The criterion incorporates the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6A and 6B (Mixed Waste Processing with low and high quality finished compost) were ranked highest for flexibility because they can accommodate the full range and quantity of residential materials generated in Region of Peel. Both systems were judged to be compatible with the existing collection system and to lead to significantly increased waste diversion.

System 5 (Wet/Dry) was ranked second highest for flexibility as it collects a wide range and greater quantity of both dry and wet materials than Systems 1 to 4. This system has greater flexibility than Systems 1 to 4, as it can divert a significant quantity of household wet wastes.

System 4 (Expanded Blue Box) was ranked third highest. While it collects a wider range and quantity of dry materials and is compatible with the Existing/Committed system, the overall projected quantities of materials collected are lower than in some systems. It does not have the flexibility to divert significant quantities of wet materials. Region of Peel currently collects most of the list of Expanded Blue Box materials, hence System 4 would not require a change in behaviour for most residents.

System 3 (Direct Cost) is ranked third lowest. It is compatible with the Existing system, but is more limited in the range of materials it diverts than Systems 4, 5, and 6. System 2 (Existing/Committed) is ranked second lowest because, while compatible with the Existing system, it will handle only a slightly increased range of materials. System 1 (Existing) is ranked lowest because it is more limited in the range and quantities of materials it diverts than other systems.

11.4.3 Performance

System 6B was ranked highest for performance because it significantly increases the amount of material diverted to 74% to 77% by the year 2000.

System 6A (Mixed Waste Processing with low quality finished compost) was ranked second highest with potential to divert 55% to 58% of the waste stream. System 5 is also ranked second highest with potential to divert 51% to 54%.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) are ranked equally as third lowest, with diversion potential of 37% to 40% for System 3 and 38% to 41% for System 4.

Systems 1 (Existing) and System 2 (Existing/Committed) are ranked lowest and second lowest respectively, due to the lower level of material diverted. These systems are estimated to divert 19% to 22% (Existing) and 25% to 28% (Existing/Committed) of the residential waste stream.

11.4.4 Social Acceptability

System 1 (Existing), System 2 (Existing/Committed) and System 4 (Expanded Blue Box) were ranked highest. Peel residents are familiar with the System components and can be expected to respond more quickly and more positively to the systems. System 1 has a significantly lower tax increase per household than all other systems and it will maintain the current 3Rs behaviour and participation. However, it is unlikely to encourage greater individual or municipal behaviour to reduce, reuse and recycle waste and will not provide the same level of service to apartment buildings (through services in buildings and the recycling centres).

System 2 has a higher tax increase per household than System 1 (but lower than System 4). It will encourage greater 3Rs behaviour and provides more convenient opportunities for self-haul of recyclables than System 1. However, it does not promote reduction and reuse opportunities to the same extent as Systems 3, 4, 5 and 6. While System 4 builds on resident and municipal familiarity with the System components, Peel Region residents will likely be unwilling to pay the large tax increase in taxes per household for this System. This potential unwillingness reduces the overall acceptability of this System.

System 3 (Direct Cost) was ranked the second highest because it has the potential to encourage greater participation in 3Rs (i.e., increased composting and source separation)

than System 1 (Existing) and System 2 (Existing/Committed) because of the economic incentive. However, residents will likely be unwilling to pay the large increase in taxes per household for this System; direct charges may not be implemented in multi-family buildings; and, it may be controversial in some municipalities. There is also greater possibility of negative attitudes developing as a result of illegal dumping and burning. This could reduce participation and limit the potential for a change in attitude to greater support for 3Rs. It was ranked higher than System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) because it has greater potential to encourage stronger positive attitudes and behaviour toward 3Rs without the serious acceptability concerns related to facilities.

System 5 (Wet/Dry) is ranked second lowest because, although it offers greater 3Rs opportunities, its acceptability is reduced because residents may be unwilling to pay the high tax increase per household and because of odour and vermin effects from the volumes of food waste at the composting facility. There is also increased potential for some Peel Region groups to participate less due to greater difficulty in using the 90 gallon carts (e.g., elderly and disabled), and for others not to separate food waste (due to the mess and inconveniences associated with the carts). The application and acceptance of the System in apartments and rural areas is uncertain.

System 6 (Mixed Waste Processing) was ranked lowest because the mixed waste processing and composting facility operation may not be acceptable due to odour problems. Also, the System does not encourage source separation and could encourage residents to reduce their participation in some of the components of the System (e.g., Blue Box). In addition, the very high tax increase per household will likely be unacceptable to Peel Region residents and municipalities.

11.4.5 Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall system ranking could be completed for the Service criteria group. Any system that received a mix of a lowest and highest rankings for reliability and performance (the two top ranked criteria) were ruled out of contention as highest ranked systems. The ultimate ranking of these systems were then evaluated using social acceptability and flexibility.

In the Region of Peel, System 6B (Mixed Waste Processing with high quality compost), was ranked highest for performance, but lowest for reliability. The same was true (in reverse) for the Existing system, and both were therefore eliminated from consideration as the highest ranked system.

System 4 (Expanded Blue Box) was ranked highest overall in the Region of Peel. It achieves similar diversion to System 3 (Direct Cost - ranked third lowest) and less than Systems 5 (Wet/Dry) and 6A (Expanded Blue Box). It was considered as reliable as System 3 (ranked second highest) and more reliable than Systems 5 and 6A. For the top ranked criteria it was comparable to Systems 3 and 5, but it was considered more socially acceptable than either system because residents are familiar with the system and can respond more quickly. It was considered moderately flexible (ranked third highest) because it does expand the range of materials collected, although not as much as Systems 5, 6A and 6B.

System 3 was ranked second highest overall. With similar diversion to System 4, and similar reliability, it is considered slightly less socially acceptable because residents may be concerned about the perception of double taxing. System 3 does not significantly expand the range of materials collected, however since flexibility is considered of lowest importance, System 3 was ranked second highest overall.

System 2 (Existing/Committed) is ranked similarly to Systems 3, 4 and 5 in combination of the two most important criteria (performance and reliability). It is considered most reliable of all systems but achieves the second lowest diversion. This is mitigated by its high social acceptability (since residents are familiar with the system and it will cause minimal tax increases). Although it is less flexible than most systems, because it was ranked comparably on the combination of performance and reliability, higher for social acceptability and slightly lower for flexibility, it was ranked equal at second highest overall, along with System 3.

System 5 was ranked third highest overall. It was ranked second highest for performance and second lowest for reliability (similar, in reverse to Systems 3 and 4). It is considered less socially acceptable than Systems 1, 2, 3 and 4 because it will cause increased taxes and may cause vermin and odour problems. While it is more flexible than most systems, (accepting wet and dry wastes) this criterion is considered of least importance.

Systems 1 (Existing) and 6B (Mixed Waste Processing with low quality compost) were both ranked second lowest overall. They achieved similar rankings in reverse for performance and reliability (System 1 is considered very reliable and achieves low diversion while System 6B achieves high diversion, but relies on a technology that is widely used but experiences technical problems). While System 1 is considered more socially acceptable, it takes a much narrower range of materials than System 6B. They were therefore considered equal.

In comparison, System 6A achieves lower diversion than System 6B and is also considered less reliable and socially acceptable than other systems. While it is as flexible as System 6B, with lower overall diversion, System 6A was ranked lowest overall.

In the Region of Peel, the system ranking under the Service criteria grouping was:

1 - System 4 (Expanded Blue Box)
2 - System 2 (Existing/Committed)
2 - System 3 (Direct Cost)
4 - System 5 (Wet/Dry)
5 - System 1 (Existing)
5 - System 6B (Mixed Waste Processing [high quality compost])
7 - System 6A (Mixed Waste Processing [low quality compost])

11.5 Social Environment Criteria Group (Peel Region)

The system rankings for the three social environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 11.5.

For the purpose of the systems evaluation for the social environment, Systems 6A and 6B were considered to be the same. These system evaluations were considered to be the same and are referred to as System 6 (Mixed Waste Processing).

11.5.1 Potential Local Community Impacts

Potential Local Community Impacts in Peel Region can be anticipated as a result of siting new 3Rs facilities and due to the expansion and increased use of existing facilities. The potential effects from the expanded use of existing facilities were taken to be the same for System 1 (Existing), System 2 (Existing/Committed), System 3 (Direct Cost) and System 4 (Expanded Blue Box).

System 1 (Existing) requires only the addition of the new MRF while Systems 2-6 require facilities in addition to the MRF. As a result, System 1 is expected to have less displacement and disruption effects than the other systems and was ranked highest.

TABLE 11.5

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Social Environment (Overall Ranking)	Second lowest ranked	Second highest ranked	Second highest ranked	Highest ranked	Second lowest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · potential displacement effects due to new MRF · potential disruption effects due to new MRF and increased use of existing facilities	Second highest ranked due to: · potential displacement effects due to new MRF and community recycling centres · potential disruption effects due to new MRF, community recycling centres and increased use of existing facilities	Third highest ranked due to: · potential displacement effects due to new MRF and community recycling centres · potential disruption effects due to new MRF, community recycling centres and increased use of existing facilities · additional potential disruption effects from illegal dumping and burning	Second highest ranked due to: · potential displacement effects due to new MRF and community recycling centres · potential disruption effects due to the new MRF, community recycling centres and increased use of existing facilities	Second lowest ranked due to: · potential displacement effects due to new MRF, community recycling centres and the new centralized composting facility for wet waste · potential for disruption effects due to new and existing facilities	Lowest ranked due to: · potential displacement effects due to the new MRF, community recycling centres and new centralized mixed waste processing and composting facility · potential for disruption effects due to new and existing facilities
Potential for Broad Social Impact	Lowest ranked due to: · little or no potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Third highest ranked due to: · limited potential for positive lifestyle change to support increased 3Rs · limited potential for additional employment and economic development opportunities · limited negative lifestyle effects related to inconveniences	Second highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · potential for additional employment and economic development opportunities · potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for negative lifestyle effects associated with illegal dumping and burning	Highest ranked due to: · potential for positive lifestyle change to support increased 3Rs · potential for additional employment and economic development opportunities · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting)	Second lowest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but uncertain if the System will realize this potential or lead to reduced participation in source separation · potential for negative lifestyle effects related to inconveniences (associated with wet/dry carts), particularly in high density areas of Peel · potential for additional employment and economic development opportunities	Lowest ranked due to: · potential for positive lifestyle change to support increased 3Rs, but may result in reduced household source separation and contamination of the recyclable stream · minor potential for negative lifestyle effects related to inconveniences (e.g., increased composting) · potential for additional employment and economic development opportunities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 11.5

PEEL REGION
RESIDENTIAL SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Third highest ranked due to: · limited potential positive benefit to future generations; System offers few 3Rs opportunities to the current generation · limited potential for positive distributional effects; 3Rs opportunities not targeted to all housing types · limited potential for negative distributional effects from facilities	Second highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) but limited by lack of application to multi-family housing · limited potential for negative distributional effects from facilities · potential for negative distributional effects on low income groups	Highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting) · limited potential for negative distributional effects from facilities	Third highest ranked due to: · potential positive benefit to future generations through continuing growth in changes to 3Rs lifestyle & behaviour · potentially equitable distributional effects among housing types (e.g., increased composting), although application to multi-family housing is limited · potential for negative distributional effects due to facilities	Lowest ranked due to: · potential positive benefit to future generation from highest volumes of waste diverted, but potential for negative effect on future 3Rs behaviour from reduced participation in source separation · potentially equitable distributional effects as 3Rs opportunities targeted to all housing types · potential for negative distributional effects due to facilities

Systems 2 (Existing/Committed) and 4 (Expanded Blue Box) were both ranked the second highest because they require the same new facilities and similar potential local community effects are expected. In these Systems there is only the addition of the community recycling centres in addition to the new MRF.

System 3 (Direct Cost) was ranked third highest. While it has the same facilities as Systems 2 and 4 and is expected to have similar displacement and disruption effects due to these facilities, there is the potential for additional disruption effects from illegal dumping and burning.

System 5 (Wet/Dry) was ranked second lowest because of the potential for displacement and disruption effects due to the construction and operation of the large centralized wet/dry composting facility. This would include the potential for greater odour effects associated with the composting facility and the volume of food wastes expected to be collected and composted. Although existing composting sites will be closed, this may result in additional effects on residents and special/sensitive groups in Peel Region due to odour and health concerns and traffic related effects.

System 6 (Mixed Waste Processing) was ranked the lowest because the displacement and disruption effects on residents, special/sensitive groups, community features and businesses and the community of a mixed waste processing and composting facility along with the effects of the MRF, community recycling centres and composting facilities of Systems 2, 3, 4 and 5, are expected to be more significant than the effects associated with the other systems.

11.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on Peel Region's broad social environment in terms of the lifestyle of people, and the direct employment and economic development opportunities. An important consideration in lifestyle change is the level of personal involvement in the management of the household waste; the greater the personal involvement, the more beneficial the lifestyle is taken to be for reducing, reusing and recycling waste.

System 4 (Expanded Blue Box) was the highest ranked because it is a continuation of current lifestyles to support 3Rs and it is familiar to residents. This should encourage residents to separate a greater number of materials, more frequently and with less error than the other systems. It is easy to implement and suitable to the low density character of Peel Region. System 4 also has slightly greater potential for minor additional direct

employment and economic development opportunities than Systems 1-3. Systems 1 (Existing) and 2 (Existing/Committed) do not provide as many source separation opportunities to as great a number of people.

System 3 (Direct Cost) was ranked second highest because it too should continue the current change to a lifestyle (through an economic incentive to households) that incorporates higher levels of personal involvement by Peel Region residents in the management of their wastes. However, there is a greater potential for some residents to engage in illegal dumping and burning to reduce the amount of waste for which they have to pay collection costs. In addition, System 3 does not represent an additional incentive to apartment residents to recycle and is unlikely to contribute to a change in their lifestyle. It is also uncertain how it will be received in rural areas.

System 2 (Existing/Committed) was ranked third highest because it provides for minor changes in lifestyle to more personal involvement of residents in managing their wastes. There is some potential for positive lifestyle change improvement over System 1 and it does not involve the potential for negative lifestyle effects and inconveniences which are found in Systems 5 and 6. The components of the System are convenient for residents and some are applicable in high density areas.

System 5 (Wet/Dry) was ranked second lowest because it is uncertain whether the System will achieve a change in lifestyle in Peel Region that incorporates personal involvement in the management of waste. The opportunity still exists for residents to not separate their recyclables and compostables, but instead put them into the garbage stream. In addition, it is uncertain if the System can be implemented effectively in apartment buildings. System 5 introduces a number of lifestyle inconveniences and effects on special/sensitive groups related to the required sorting and storage of food waste, e.g., elderly and disabled having to use 90 gallon carts for their waste and separated materials. The significance of these inconveniences is uncertain. System 5 has greater potential than Systems 1-3 to increase direct employment and economic development opportunities.

Systems 1 (Existing) and 6 (Mixed Waste Processing) were ranked the lowest because the net change for these Systems is considered less positive than for Systems 2,3,4 and 5. System 1 provides limited support for a change in lifestyle to more personal involvement of residents in managing their wastes and has limited potential for an increase in direct employment and economic development opportunities. System 6 has greater potential than the other systems for minor direct employment and economic development opportunities. However, it may not continue the change in lifestyle to support 3Rs behaviour and may not support further development of the 3Rs (residents have the option of placing all their waste in the garbage stream).

11.5.3 Distribution of Social Costs and Benefits

Distributional effects within Peel Region are predicted to occur as a result of lifestyle changes on some groups in the Region and as a result of effects on future generations. System 4 (Expanded Blue Box) was the highest ranked due to its overall positive current and future generation effects. It provides 3Rs opportunities to more people than Systems 1 and 2, and provides more equitable distribution of 3Rs opportunities among housing types by providing composting and recycling opportunities to multi-family households. It continues the growth in changes to 3Rs lifestyle/behaviour that should have a greater benefit to future generations than Systems 1 and 2. System 4 has fewer negative distribution effects than Systems 5 and 6 because fewer facilities are required.

System 3 (Direct Cost) was ranked as the second highest. System 3 has the potential for greater benefit to future generations than Systems 1, 2 and 6. The economic incentive should encourage a change in behaviour to support greater reduction, reuse and recycling which should lead to greater conservation of the environment and a reduction in the management of the current generation's waste by the future. It improves the distribution of 3Rs opportunities over Systems 1 and 2 by providing the opportunity for a higher proportion of Peel households to participate in 3Rs. It provides an incentive to change behaviour to participate more effectively in 3Rs. System 3 does, however, have the potential to increase the financial burden on low income households.

Systems 2 (Existing/Committed) and 5 (Wet/Dry) were ranked equally as the third highest based on the uncertainties associated with the significance and magnitude of the different potential effects of the Systems. System 2 has the second least positive effect on future generations with some additional support over System 1 (Existing) for changes in lifestyle to encourage greater personal involvement by residents in the management of their waste. It has a small improvement in the provision of 3Rs opportunities to a greater proportion of Peel Region households than System 1, but has a small increase in negative distribution of effects due to facilities in comparison to System 1.

System 5 (Wet/Dry) has a greater potential for negative distributional effects from new facilities than Systems 1, 2, 3 and 4. However, it has greater potential for a positive effect on future generations than Systems 1, 2 and 6 and has a positive distributional effect of 3Rs opportunities.

System 6 (Mixed Waste Processing) was ranked lowest. It has potentially the most significant negative distributional effects on some Peel residents from the operation of the mixed waste processing and composting facility. In addition, there is the uncertainty of the benefit to future generations through the recovery of more recyclable material from the

waste stream, with the possibility of influencing behaviour away from the 3Rs. It therefore ranks lowest of all the systems based on its minimal benefit to future generations. It does, however, have the most equitable distribution of 3Rs opportunities as it includes all types of residences.

System 1 (Existing) was also ranked lowest because it is likely to have a low (less potential than Systems 2-5) positive distribution effect on future generations. It does not encourage as much change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also does not provide as great an improvement in the distribution of 3Rs opportunities to residents as the other systems (lowest of all the systems). However, it has the least negative distribution effects due to facilities.

11.5.4 <u>Overall System Ranking</u>

System 4 (Expanded Blue Box) was ranked the highest overall. It was ranked the highest for the criteria of Potential for Broad Social Impact and Distribution of Social Costs and Benefits and second highest for Potential Local Community Impacts.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked second highest overall. System 3 ranked third highest for Potential Local Community Impacts and second highest for both Broad Social Impact and Distribution of Social Costs and Benefits. System 2 was ranked second highest for Potential Local Community Impacts and third highest for both Broad Social Impact and Distribution of Social Costs and Benefits.

Systems 1 (Existing) and 5 (Wet/Dry) were ranked second lowest. While System 1 was ranked highest for Potential Local Community Impacts, it was ranked lowest for both Broad Social Impact and Distribution of Social Costs and Benefits. System 5 was third highest for Distribution of Social Costs and Benefits and second lowest for both Potential Local Community Impacts and Broad Social Impact.

System 6 (Mixed Waste Processing) was ranked lowest overall because it ranked lowest for all three criteria.

A list of the overall system ranking for the Social Environment criteria group for Peel Region is as follows (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 2 (Existing/Committed)
2 - System 3 (Direct Cost)
4 - System 1 (Existing)
4 - System 5 (Wet/Dry)
6 - System 6 (Mixed Waste Processing)

12.0 GTA IC&I SYSTEMS EVALUATION

The following provides a summary of the IC&I 3Rs systems evaluation and ranking for the GTA.

As previously outlined in Chapter 6.0, the six IC&I 3Rs systems which were developed include:

System 1 (Existing);
System 2 (Existing/Committed);
System 3 (Extended 3Rs Regulations);
System 4 (Expanded 3Rs Regulations);
System 5 (Expanded 3Rs Regulations with Organics); and
System 6 (No Unprocessed Waste to Landfill).

12.1 Cost Criteria Group (IC&I)

The Cost Criteria Group contained two criteria. These were:

- Diversion system cost (expressed as cost per tonne diverted); and
- Total system cost (diversion plus disposal).

The above two criteria were chosen as valuable indicators of the comparative costs of different waste diversion systems with different costs and performances. A third criterion, diversion system costs (expressed $/year), was considered to have limited meaning for the IC&I sector. It was decided that such information was adequately captured using the diversion cost/tonne indicator.

Total costs of the waste diversion system (expressed as cost per tonne diverted) are often of limited use in determining comparative efficiencies; therefore, an indicator which took into account the performance of the system was of more value. The cost per tonne diverted measured the efficiency of the waste diversion system, and was used to compare different approaches to waste management. Differences indicated the relative costs of diverting different materials.

Total system cost measured the combined cost of disposal and diversion systems. Isolated, the separate costs of diversion and disposal would have had little value as indicators, since a system which has a low diversion cost, due in part to a low diversion rate, would incur a correspondingly high disposal cost.

12.1.1 Cost Per Tonne Diverted

For the indicator cost per tonne diverted, there is very little difference between Systems 1, 2, 3, 4 and 5. The costs per tonne diverted for these five systems range from $112/tonne to $120/tonne. Within the accuracy of these calculations, these are considered virtually the same. All of these systems were therefore ranked as highest.

System 6 has the highest cost per tonne diverted of all six systems, at $215/tonne, and was therefore ranked lowest. It should be noted that if there is a high degree of source separation is achieved within this system it is expected that the cost would decrease.

12.1.2 Total Waste Management System Cost

The total waste management system costs vary depending on the disposal rate chosen for the analysis. As discussed in the Cost Technical Appendix, the total system cost analysis was carried out for three disposal rates for the IC&I system analysis. These disposal rates were $50/tonne, $85/tonne, and $100/tonne.

At a disposal rate of $50/tonne, the difference in total system cost between System 1 and System 6 is somewhat significant. At this disposal rate, total system costs range from $335 million/year for System 1 to $430 million for System 6; therefore System 6 costs 28% more than System 1. The costs of Systems 2 to 5 vary from $338 million/year to $358 million/year at this disposal rate.

At a disposal rate of $100/tonne, the costs of Systems 1 and 2 are highest, at $451 million/year, whereas the costs of the other systems vary from $422 million/year for System 5 to $437 million/year for System 3. Within the accuracy of the estimate, all of these costs are considered equal.

At a disposal rate of $85/tonne, system costs vary from the lowest system cost of $403 million/year for System 5, to $430 million/year for System 6. Again, within the accuracy of the estimate, these costs are considered equal.

The above analysis illustrates that Total System Costs are sensitive to low disposal charges. Where a low disposal charge of $50/tonne is assumed, high diversion systems have overall higher system costs, and would be ranked lower than low diversion systems from an overall cost point of view. As disposal charges increase, high diversion systems are comparatively less costly. At a disposal rate of $100/tonne, systems which divert low quantities of waste are more costly than high diversion systems.

Because of the uncertainty regarding future disposal charges in the GTA, which in turn impact on the comparative costs of IC&I 3Rs systems, and considering the limitations of the approach used for cost estimation, the quality of the available data on which the analysis was carried out, and the accuracy of the estimate, the costs of IC&I systems are considered to be within the same order of magnitude for all disposal rates. Therefore, the six IC&I systems are ranked equally as highest.

12.1.3 Overall IC&I System Ranking for Cost

Table 12.1 summarizes the system rankings from the cost perspective.

In overall system ranking, total waste management system cost was considered the most important criterion, while the cost per tonne diverted was used to differentiate between systems, if necessary. On this basis, Systems 1 through 6 were ranked the same, due to similar overall system costs.

12.2 Municipal Finance Criteria Group (IC&I)

Under the Municipal Finance Criteria Group, only the criterion "Potential for Impact on Private Sector Industries" was considered in the IC&I 3Rs systems evaluation. As the total system cost difference among the alternative IC&I systems was relatively minor, all IC&I systems were considered to be equal for this criteria group.

It should also be noted that the potential for impact on economic development was addressed under the Social Environment criteria group.

TABLE 12.1

GTA IC&I
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
COST						
Cost (Overall Ranking)	Highest	Highest	Highest	Highest	Highest	Highest
Diversion Cost ($ per tonne diverted)	Highest due to: · $112/tonne	Highest due to: · $114 to $116/tonne	Highest due to: · $117/tonne	Highest due to: · $120/tonne	Highest due to: · $117/tonne	Lowest due to: · $215/tonne
Total System Cost ($/year)	Highest due to: · $335 million (disposal $50/tonne) · $416 million (disposal $85/tonne) · $451 million (disposal $100/tonne)	Highest due to: · $338-$341 million (disposal $50/tonne) · $416-$417 million (disposal $85/tonne) · $448-$451 million (disposal $100/tonne)	Highest due to: · $349 million (disposal $50/tonne) · $411 million (disposal $85/tonne) · $437 million (disposal $100/tonne)	Highest due to: · $359 million (disposal $50/tonne) · $411 million (disposal $85/tonne) · $434 million (disposal $100/tonne)	Highest due to: · $358 million (disposal $50/tonne) · $403 million (disposal $85/tonne) · $422 million (disposal $100/tonne)	Highest due to: · $430 million (disposal $50/tonne) · $430 million (disposal $85/tonne) · $430 million (disposal $100/tonne)

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

12.3 Natural Environment Criteria Group (IC&I)

The IC&I system rankings for the three Natural Environment criteria are discussed below. The rankings by criterion are summarized in Table 12.2

12.3.1 Potential for Effects to Terrestrial Systems and Resources

For the IC&I 3Rs systems, effects to terrestrial systems and resources were predicted to occur as a result of expanding existing facilities or from siting new facilities. System 1 (Existing), and System 2 (Existing/Committed) for the IC&I sector do not require any new facilities. These two systems were both ranked highest for this criterion. Both Systems 3 and 4 require additional capacity to process larger quantities of dry recyclables. These systems include expansions to existing MRFs, to accommodate these increased quantities, or the siting of new MRFs. The potential effects due to these expansions or new facilities can largely be mitigated by siting facilities in areas of compatible land uses. As a result of these disadvantages, Systems 3 and 4 were ranked equally and slightly lower than Systems 1 and 2, or third highest. Systems 5 and 6 require both additional processing capacity for dry recyclables and increased capacity for the composting of wet wastes. These systems will require the siting of new MRFs and new compost facilities. The siting of these facilities is expected to result in a greater potential for effects to terrestrial systems due to the loss or removal of existing terrestrial features. Systems 5 and 6 were equally ranked lowest of the six systems due to these disadvantages.

12.3.2 Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems and water resources were expected to occur as a result of siting facilities and discharges from facilities. Effects may include the disruption of local surface water drainage patterns due to the siting of a facility or the discharge of contaminants from facilities. These discharges may include leachate and surface water runoff, containing silt and organic materials, from central compost facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all six of the IC&I systems. Systems 1 and 2 require no new or expanded facilities. These two systems were ranked highest. The new or expanded MRFs necessary to process increased quantities of dry recyclables in Systems 3 and 4 may result in some additional effects. These effects are expected to be minimal since no discharges are likely from these dry processes. Systems 3 and 4 were ranked slightly lower than the first two systems and third highest because of this disadvantage. A significant increase in the

TABLE 12.2

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing of All IC&I Waste
IMPACT						
Natural Environment (Overall Ranking)	Highest ranked with System 2	Highest ranked with System 1	Third highest ranked with System 4	Third highest ranked with System 3	Lowest ranked with System 6	Lowest ranked with System 5
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already exist	Highest ranked due to: · necessary facilities already exist	Third highest ranked due to: · potential effects due to expanding existing MRFs or siting new MRFs	Third highest ranked due to: · potential effects due to expanding existing MRFs or siting new MRFs	Lowest ranked due to: · potential effects due to siting new MRFs and compost facilities	Lowest ranked due to: · potential effects due to siting new MRFs and compost facilities
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Third highest ranked due to: · potential effects due to discharges from existing facilities · new or expanded MRFs required which may result in additional effects	Third highest ranked due to: · potential effects due to discharges from existing facilities · new or expanded MRFs required which may result in additional effects	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRFs and compost facilities and discharges from new compost facilities	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRFs and compost facilities and discharges from new compost facilities

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 12.2

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing of All IC&I Waste
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · no increased emissions since no increase in collection or IC&I organics processing	Highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · no increased emissions since no increase in collection or IC&I organics processing	Third highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements	Third highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements	Lowest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements and IC&I organics processing	Lowest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements and IC&I organics processing

quantity of wet wastes (IC&I organics) will be processed and composted in Systems 5 and 6. Both systems require the siting of new MRFs and compost facilities. Potential effects are also expected due to discharges from the new compost facilities. As a result of these disadvantages, Systems 5 and 6 were ranked equally as the lowest of the six IC&I systems.

12.3.3 Potential for Effects to the Atmospheric Environment

All six IC&I system alternatives were expected to have emissions to the atmospheric environment. These emissions include dust, odours, bioaerosols, and gases generated at MRFs, processing centres and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. Emissions to the atmosphere are reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. Effects to the atmospheric environment from emissions was expected to increase with the level of collection vehicle requirements and amount of IC&I organics processed and composted at centralized facilities in large volumes. An increase in vehicle emissions was considered to be a disadvantage of the system. Systems 1 and 2 maintain the present level of waste collection service and IC&I organics processing, resulting in no increase in emissions. These two IC&I systems were equally ranked highest. Systems 3 and 4 require that increased quantities of dry recyclables be collected. As a result these systems have increased collection vehicle requirements and additional emissions to the atmosphere. These systems were both ranked third highest. The last two systems, Systems 5 and 6, are expected to have the greatest potential for effects to the atmospheric environment. Both systems include an increased level of IC&I organics collection and processing. These systems have the greatest requirements for collection vehicles. They also have the largest amount of IC&I organics processing and composting. Systems 5 and 6 were ranked lowest.

12.3.4 Overall System Ranking

Combining the ranking of systems by criterion with the criteria rankings allows an overall system ranking to be completed for the Natural Environment criteria group. Systems 1 and 2 (Existing and Existing/Committed respectively) were both ranked highest for each of the three criteria. These two systems do not require any new 3Rs facilities, increased vehicle collection requirements or increase in IC&I organics processing. Systems 1 and 2 will result in the lowest potential for effects to the natural environment. Systems 3 and 4 both require the expansion of existing MRFs or the siting of new MRFs. The siting of

these new facilities may result in potential effects to both terrestrial systems and aquatic systems. Increased collection vehicle requirements are also required, resulting in additional emissions to the atmosphere. Systems 3 and 4 were ranked third highest for all these criteria. Overall, Systems 3 and 4 were ranked third highest.

IC&I System 5 and System 6 were both ranked lowest. These two systems require increased processing capacity for dry recyclables and IC&I organics. This includes the siting of new MRFs and compost facilities. These systems are expected to have the greatest effects on terrestrial and aquatic systems due to siting new facilities and discharges from the new compost facilities. In addition, these systems have the largest collection vehicle requirements and largest amount of IC&I organics processing. Systems 5 and 6 are expected to have the greatest level of emissions to the atmosphere for all of the systems.

A list of the overall IC&I system ranking for the Natural Environment criteria group follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
3 - System 3 (Extended 3Rs Regulations)
3 - System 4 (Expanded 3Rs Regulations)
5 - System 5 (Expanded 3Rs Regulations with Organics)
5 - System 6 (No Unprocessed Waste to Landfill)

12.4 Service Criteria Group (IC&I)

Service criteria group ranking for IC&I systems was completed on the basis of the level of importance of the criteria relative to the others. In order to rank the criteria, consideration was given to the magnitude of effects, duration of effects, significance of effects, certainty of effects and the relative difference among options.

The criteria rankings for the Service criteria group are presented in Table 12.3 along with the rationale for these rankings.

TABLE 12.3

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	IC&I System 1 Existing	IC&I System 2 Existing/Committed	IC&I System 3 Extended 3Rs Regulations	IC&I System 4 Expanded 3Rs Regulations	IC&I System 5 Expanded 3Rs Regulations with Organics	IC&I System 6 No Unprocessed Waste to Landfill
SERVICE						
Service (Overall Ranking)	Lowest	Third highest	Second Highest	Highest	Second lowest	Lowest
Reliability	Highest due to: · technologies presently exist and are proven · technologies rely on voluntary source separation and recovery of recyclables	Highest due to: · technologies presently exist and are proven · impacts of 3Rs Regulations proven in Rhode Island, N.Y. · success is partially dependent on the extent to which institutions are covered by 3Rs Regulations which is limited to the largest generators · incremental impact of 3Rs Regulations on waste diversion expected to be minor due to coverage · success also depends on voluntary source separation and recovery of recyclables · success depends to some extent on effective monitoring and follow-up to ensure compliance (no specific measures to ensure compliance) effective source separation and diversion	Second highest due to: · technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs Regulations not demonstrated · effective monitoring and follow-up required to ensure compliance and effective source separation and diversion · some technical limitations on handling some materials such as plastics	Third highest due to: · technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs Regulations covering a wider range of mandated materials not demonstrated · effective monitoring and follow-up required to ensure compliance and effective source separation and diversion · some technical limitations on handling some materials particularly plastics	Second lowest due to: · technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs Regulations covering a wide range of dry materials, and also wet materials not demonstrated · effective monitoring and follow-up required to ensure compliance and effective source separation and diversion · potential problems of storage for some generators of wet organics particularly small generators of food wastes	Lowest due to: · system builds on Existing/Committed source separation requirements · technologies presently exist to process most, but not all, materials · may not be proven at large scale (approach used in Minnesota) · uncertainty regarding how requirement would be met by private sector companies · some technical limitations on processing some materials particularly plastics · depends on effective flow control to achieve high diversion

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 12.3

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	IC&I System 1 Existing	IC&I System 2 Existing/Committed	IC&I System 3 Extended 3Rs Regulations	IC&I System 4 Expanded 3Rs Regulations	IC&I System 5 Expanded 3Rs Regulations with Organics	IC&I System 6 No Unprocessed Waste to Landfill
Flexibility	Lowest due to: · limited range and quantity of materials recovered · range and quantity of materials diverted depends entirely on voluntary commitment · very limited diversion of organics	Second lowest due to: · range of dry materials handled are defined by 3Rs Regulations according to IC&I sector and are limited · both range and quantity of materials diverted depend on the coverage of the 3Rs Regulations which is limited to the largest generators · increased processing capacity will be provided by private sector · very limited diversion of organics	Third lowest due to: · designed to divert virtually all of the most easily recovered and marketable dry materials · both range and quantity of materials are defined by the extended 3Rs Regulations which limited to the largest generators · increased processing capacity may be required and will be provided by private sector · some technical limitations for processing and recycling some materials become more significant · very limited diversion of organics	Third highest due to: · collects wider range of dry materials · designed to divert virtually all of the major waste materials except wet organics · increased processing capacity may be required and will be provided by private sector · some technical limitations for processing and recycling some materials become more significant · very limited diversion of organics	Second highest due to: · designed to divert virtually all of the major waste materials including wet organics · increased processing capacity may be required for both wet and dry wastes, and will be provided by private sector · some technical limitations for processing and recycling some materials become more significant	Highest due to: · designed to recover virtually all recyclables · increased processing capacity may be required for wet, dry specialized (eg C&D) and mixed wastes · markets will govern materials recovered in processing and effective diversion · some technical limitations on processing some materials, particularly plastics
Performance	Lowest due to: · limited waste diversion of 28-33%	Lowest due to: · limited waste diversion potential of 30% to 35% and 34% to 39% (low and high estimates of number of amount of IC&I waste stream subject to regulations respectively)	Second lowest due to: · estimated waste diversion potential of 46% to 51%	Second highest due to: · estimated waste diversion potential of 54% to 59%	Highest due to: · estimated waste diversion potential of 60%-65% · significant diversion of IC&I organics	Highest due to: · estimated waste diversion potential of up to 62%-67% · significant diversion of IC&I organics

TABLE 12.3

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	IC&I System 1 Existing	IC&I System 2 Existing/Committed	IC&I System 3 Extended 3Rs Regulations	IC&I System 4 Expanded 3Rs Regulations	IC&I System 5 Expanded 3Rs Regulations with Organics	IC&I System 6 No Unprocessed Waste to Landfill
Social Acceptability	Second lowest ranked due to: · low potential for participation · operators appear willing to pay for voluntary measures · potential for voluntary compliance by those not regulated	Second highest ranked due to: · low potential for participation · small IC&I generators not significantly affected by regulations · potential increase in employee and corporate pride · potential for IC&I willingness to pay; some major IC&I generators currently implement regulations · generally limited negative attitudes to System	Highest ranked due to: · potential for greater participation · many small operators will be required to comply; smallest operators not required to participate · potential for negative attitudinal effect by some IC&I generators because of increased regulation; potential for increase in employee pride · increase in cost of compliance	Highest ranked due to: · potential for greater participation · many small operators will be required to comply; smallest operators not required to participate · potential for negative attitudinal effect by some IC&I generators because of increased regulation; potential for increase in employee pride · increase in cost of compliance	Second lowest ranked due to: · potential for greater participation · potential negative attitudes from grocery and restaurant sector · all but smallest operators required to participate · cost of compliance higher for small IC&I generators with more effects on grocery and restaurant sector; health and customer issues with restaurants due to storage and sorting food waste · potential for non-compliance	Lowest ranked due to: · potential for maximum participation as the entire IC&I sector is required to participate · costly to implement with significant cost of compliance for small to medium size public and independent private operators · potential for non-compliance · potential for negative attitudes and perceptions

12.4.1 Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year.

Since the variety of technologies within System 1 (Existing) have been proven (specifically for the GTA), it is ranked highest with respect to reliability. System 2 (Existing/Committed) was ranked highest since it relies on the same variety of systems, and existing facilities are likely to be capable to scale up to handle the increase in diverted materials.

Systems 3, 4 and 5 (Extended 3Rs, Expanded 3Rs and Expanded 3Rs with Organics respectively) were ranked second and third highest, and second lowest respectively. System 3 (Extended 3Rs) relies on the same variety of technologies as System 2 (Existing/Committed) but the amount of materials handled will be significantly greater. Also, the effect of extensive 3Rs regulations is not proven in any other jurisdiction at this time. System 4 (Expanded 3Rs) is also based on proven technology, but the scale is increased over Systems 2 and 3. Source separation and processing of some materials (such as some plastics), is not proven on a large scale. System 5 (Expanded 3Rs with Organics) is ranked second lowest since it builds on Systems 3 and 4 and also requires technology to handle and process organics. The technology for processing organics is proven in North America but there are some on-going operational problems, generally related to odours and finished compost quality and markets.

System 6 (No Unprocessed Waste to Landfill) was ranked lowest because it requires the variety of technologies required in Systems 3, 4 and 5 (at a somewhat larger scale) but also additional technologies to process the more varied waste stream involved (e.g. facilities handling and processing mixed dry IC&I wastes).

12.4.2 Flexibility

System flexibility was judged according to the types and quantities of waste accommodated. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities.

System 1 (Existing) was ranked lowest for flexibility. System 6 (No Unprocessed Waste to Landfill) was ranked highest, as it handles the full range of IC&I waste materials generated within GTA. System 6 therefore potentially handles the greatest amount and

the greatest range of materials. Systems 2 through 5 were ranked from second lowest to second highest in ascending order. These systems handle an increasing range and/or quantity of materials, progressing from Systems 1 through 6. Systems 1 to 4 concentrate on diverting an increasing variety of dry materials. System 5 is ranked higher than Systems 1 to 4 because it processes and diverts both dry and wet streams.

12.4.3 Performance

System performance was judged according to the amount of material diverted, expressed as a percentage of waste generation.

Systems 5 (Expanded 3Rs with Organics) and 6 (No Unprocessed Waste to Landfill) were ranked highest for performance because they are estimated to divert the greatest quantity of material from disposal (60% to 65% with source reduction and 62% and 67% with source reduction respectively). Systems 1 (Existing) and 2 (Existing/Committed) were ranked lowest as they divert the least material from disposal (28% to 33% is estimated for the Existing system. A diversion rate of 30% to 35% is estimated for the Existing/ Committed system at 40% coverage and 34% to 39% with 60% coverage.

System 3 (Extended 3Rs) was ranked second lowest with potential diversion estimated at 46% to 51%). System 4 was ranked second highest with potential diversion of 54% to 59%.

12.4.4 Social Acceptability

Systems 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked the highest. System 3 has the primary advantage of requiring a much higher level of participation (approximately 70% of all IC&I generators) than Systems 1 and 2, the same as System 4, slightly less than System 5 and moderately less than System 6. The Systems do not require the smallest operators, who are likely to have the greatest difficulty in implementing the regulations, to comply. System 4 has the same components as System 3, but expands the list of dry recyclables. The effects of this System are similar to System 3, but with some potentially increased costs to generators.

The disadvantages of Systems 3 and 4 are that some smaller businesses, industries and institutions will need to comply with the regulations, with the possibility of negative attitudes and perceptions by owners/managers and increased costs for the operators. These negative attitudes and perceptions will be focused primarily on the regulation for

mandatory separation. It is assumed that these generators will have the option of either source separating or contracting a collection service that will separate the materials at the dry waste processing facility. Having the option to choose may improve its acceptability. The Systems may also encourage growth in employee pride and enthusiasm for 3Rs.

System 2 (Existing/Committed) was ranked second highest. It has the second least potential for participation. Small IC&I operators will not be significantly affected by this System and it is expected to be less costly to generators than Systems 3 - 6, with a resulting greater willingness to pay and more positive attitudes and perceptions on the part of the IC&I sector.

Systems 1 (Existing) and 5 (Expanded 3Rs Regulations with Organics) were ranked equally as the second lowest. System 1 has the least potential for increased participation. Public and private operators appear willing to pay the current costs for waste management. System 5 has a slightly greater potential for participation than Systems 3 and 4 (much greater than System 1), but the effect of the mandatory separation of wet waste is likely to elicit negative attitudes from the restaurant and grocery sector because of potential health, odour and vermin concerns and added costs for clients. System 5 is likely to apply to many small operators/owners in the restaurant and grocery sector, where compliance might be very difficult.

System 6 (No Unprocessed Waste to Landfill) was ranked the lowest because, although it will have the greatest participation, it is likely to be the most costly for individual operators to implement and will affect the entire IC&I sector. It is likely to have particularly negative effects on small and medium sized businesses and institutions, as they may need additional storage space and staff time to source separate. They will also pay proportionally more than larger operators for a hauler to separate the materials. There will likely be negative attitudes towards this System. All generators will be covered by the legislation and there is likely to be greater problems in obtaining compliance.

12.4.5 Service Criteria Group - Overall System Ranking

Social acceptability, performance and reliability were the criteria considered of greatest importance. Flexibility was considered of less importance in system ranking.

Of the IC&I Systems, System 4 (Expanded 3Rs Regulations) was ranked highest overall. It was very similar to System 3 (Extended 3Rs Regulations) on the top three ranked criteria: performance, reliability and social acceptability. In the top three criteria, Systems 3 and 4 received one ranking each of highest, second and third highest.

Specifically, both were ranked highest for social acceptability. System 4 achieved second highest diversion and was ranked third highest for reliability, while System 3 achieved third highest diversion and was ranked second highest for reliability.

System 4 was considered third most flexible because it is designed to process virtually all dry recyclables and was therefore ranked highest overall. System 3 is third least flexible with a narrower range of dry materials collected than System 4 (collecting most of the materials that can be easily collected and marketed). System 3 is therefore ranked second highest overall.

System 2 (Existing/Committed) was ranked third highest overall. Along with System 1 (Existing), it was most reliable (because technologies exist and are widely proven) but achieves lowest diversion. This similar (in reverse) to System 5 (Expanded 3Rs Regulations with Organics) which is considered second least reliable due to increased unpredictability because of the wider range of materials (including organics) that are collected and because it relies heavily on effective regulations and compliance monitoring.

System 5 is considered less socially acceptable than System 2 (due to potentially high costs of compliance for small IC&I generators and negative attitudes). System 2 which was second most socially acceptable (considered likely to be acceptable to most IC&I generators), and second least flexible. Flexibility is considered the least important criterion, and System 2 was therefore ranked third highest overall. Because System 5 was considered second most flexible while System 1 was considered least flexible, System 5 was ranked second lowest overall, and System 1 was ranked lowest.

System 6 (No Unprocessed Waste to Landfill) was also ranked lowest overall. While it achieved the highest diversion, it was considered least socially acceptable and reliable of all systems. It was considered most flexible, although this criterion is considered least important. It was therefore ranked equally with System 1 as lowest overall.

The IC&I system ranking under the Service criteria group was:

1 - System 4 (Expanded 3Rs Regulations)
2 - System 3 (Extended 3Rs Regulations)
3 - System 2 (Existing/Committed)
4 - System 5 (Expanded 3Rs Regulations with Organics)
5 - System 1 (Existing)
5 - System 6 (No Unprocessed Waste to Landfill)

12.5 Social Environment Criteria Group (IC&I)

The system rankings for the three Social Environment Criteria are discussed below. The system rankings, by criterion, are summarized in Table 12.4.

12.5.1 Potential Local Community Impacts

Potential Local Community Impacts can be anticipated as a result of siting new IC&I 3Rs facilities and due to the expansion and increased use of existing facilities. The potential effects of expanded use of existing facilities were taken to be the same for Systems 1 (Existing) and 2 (Existing/Committed). Systems 1 and 2 have all the necessary facilities in place while the other systems may require new facilities which have the potential to affect local communities. As a result, Systems 1 and 2 were ranked equally as the highest.

Systems 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked as the second highest because, while they both require new dry materials processing facilities, no new compost facilities are required. Therefore, the potential displacement and disruption effects may be greater than Systems 1 and 2, but less than for Systems 5 and 6.

System 5 (Expanded 3Rs Regulations with Organics) was ranked the second lowest because it requires new dry materials processing facilities similar to Systems 3 and 4 and because of the need for more or expanded compost facilities, with the greater potential for odour effects from the "wet" waste. These additional facilities may result in additional nuisance effects on residents and special/sensitive groups due to odour effects, health concerns and increased traffic.

System 6 (No Unprocessed Waste to Landfill) was ranked lowest because of the impacts associated with the new dry materials processing facilities and composting facilities that will be required to process all IC&I waste in the GTA. Although similar to the effects from the facilities in System 5, these effects are expected to be greater than Systems 1-5.

TABLE 12.4

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
IMPACT						
Social	Second highest ranked	Highest ranked	Second highest ranked	Second highest ranked	Second lowest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · new facilities likely are not required · effects are likely due to increased use of existing facilities · potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Highest ranked due to: · new facilities likely are not required · effects are due to increased use of existing facilities · potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Second highest ranked due to: · new dry materials processing facilities may be required; no new compost facilities required · effects are likely due to increased flow of materials and possible new dry materials processing facilities · potential for displacement effects · potential for increased disruption effects	Second highest ranked due to: · new dry materials processing facilities may be required; no new compost facilities required · effects are likely due to increased flow of materials and possible new dry materials processing facilities · potential for displacement effects · potential for increased disruption effects	Second lowest ranked due to: · new dry materials processing facilities likely will be required · new or expanded compost facilities will be required · potential for significant odour effects from composting facilities · potential for nuisance effects, primarily associated with compost facilities · potential for displacement effects from new facilities	Lowest ranked due to: · new dry materials processing facilities and composting facilities required · potential for significant odour effects · greatest potential for nuisance effects from existing and new facilities · greatest potential for displacement effects from new facilities
Potential for Broad Social Impact	Third highest ranked due to: · limited amount of regulation and low cost to the IC&I sector · potential to develop direct employment and economic opportunities in the waste management sector	Highest ranked due to: · limited regulation on the IC&I sector with increased cost over System 1 for major IC&I · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs. Will affect some types of businesses and institutions (grocery, hospitals, etc.) more · potential to develop direct employment and economic opportunities in the waste management sector, primarily in composting	Lowest ranked due to: · Regulation of the entire IC&I sector with potential cost increases · potential to develop direct employment and economic opportunities in the waste management sector as full and specialized service will be required

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

12.5 Social Environment Criteria Group (IC&I)

The system rankings for the three Social Environment Criteria are discussed below. The system rankings, by criterion, are summarized in Table 12.4.

12.5.1 Potential Local Community Impacts

Potential Local Community Impacts can be anticipated as a result of siting new IC&I 3Rs facilities and due to the expansion and increased use of existing facilities. The potential effects of expanded use of existing facilities were taken to be the same for Systems 1 (Existing) and 2 (Existing/Committed). Systems 1 and 2 have all the necessary facilities in place while the other systems may require new facilities which have the potential to affect local communities. As a result, Systems 1 and 2 were ranked equally as the highest.

Systems 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked as the second highest because, while they both require new dry materials processing facilities, no new compost facilities are required. Therefore, the potential displacement and disruption effects may be greater than Systems 1 and 2, but less than for Systems 5 and 6.

System 5 (Expanded 3Rs Regulations with Organics) was ranked the second lowest because it requires new dry materials processing facilities similar to Systems 3 and 4 and because of the need for more or expanded compost facilities, with the greater potential for odour effects from the "wet" waste. These additional facilities may result in additional nuisance effects on residents and special/sensitive groups due to odour effects, health concerns and increased traffic.

System 6 (No Unprocessed Waste to Landfill) was ranked lowest because of the impacts associated with the new dry materials processing facilities and composting facilities that will be required to process all IC&I waste in the GTA. Although similar to the effects from the facilities in System 5, these effects are expected to be greater than Systems 1-5.

TABLE 12.4

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
IMPACT						
Social	Second highest ranked	Highest ranked	Second highest ranked	Second highest ranked	Second lowest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · new facilities likely are not required · effects are likely due to increased use of existing facilities · potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Highest ranked due to: · new facilities likely are not required · effects are due to increased use of existing facilities · potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Second highest ranked due to: · new dry materials processing facilities may be required; no new compost facilities required · effects are likely due to increased flow of materials and possible new dry materials processing facilities · potential for displacement effects · potential for increased disruption effects	Second highest ranked due to: · new dry materials processing facilities may be required; no new compost facilities required · effects are likely due to increased flow of materials and possible new dry materials processing facilities · potential for displacement effects · potential for increased disruption effects	Second lowest ranked due to: · new dry materials processing facilities likely will be required · new or expanded compost facilities will be required · potential for significant odour effects from composting facilities · potential for nuisance effects, primarily associated with compost facilities · potential for displacement effects from new facilities	Lowest ranked due to: · new dry materials processing facilities and composting facilities required · potential for significant odour effects · greatest potential for nuisance effects from existing and new facilities · greatest potential for displacement effects from new facilities
Potential for Broad Social Impact	Third highest ranked due to: · limited amount of regulation and low cost to the IC&I sector · potential to develop direct employment and economic opportunities in the waste management sector	Highest ranked due to: · limited regulation on the IC&I sector with increased cost over System 1 for major IC&I · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs · potential to develop direct employment and economic opportunities in the waste management sector	Second highest ranked due to: · broad regulation of the IC&I sector with increased costs. Will affect some types of businesses and institutions (grocery, hospitals, etc.) more · potential to develop direct employment and economic opportunities in the waste management sector, primarily in composting	Lowest ranked due to: · Regulation of the entire IC&I sector with potential cost increases · potential to develop direct employment and economic opportunities in the waste management sector as full and specialized service will be required

Note: Table does not present potential impacts in comparative terms (among systems). See text for comparative evaluation to support the system rankings.

TABLE 12.4

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
Potential for Broad Social Impact (con't)	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects on the IC&I sector	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects; restricted mainly to major IC&I who can accommodate the requirements	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour and operations	· potential to positively affect IC&I attitudes, behaviour and operations · potential for negative affect on operation of many IC&I from source separation of wet waste
Distribution of Social Costs and Benefits	Second highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations · positive effect on distribution of regulation	Highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Avoids smallest businesses, but is broadly based	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Additional requirement for some IC&I	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential for high positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Affects everyone, but appear to be few provisions for small businesses

12.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the GTA's broad social environment in terms of the lifestyle of employees and organizations (corporate culture), and the direct employment and economic development opportunities.

System 2 (Existing/Committed) was ranked the highest because it applies primarily to the major IC&I operations; those which are best able to pay additional costs. It also will likely have the greatest potential to positively affect IC&I attitudes, perceptions and behaviour, because the regulations in this System have been incorporated as a part of normal operations into some institutions, businesses and industry. Over a longer period of time, other operators are likely to comply voluntarily with some of the regulations. However, it has the second least potential to develop direct employment and economic development opportunities.

Systems 3 (Extended 3Rs Regulations), 4 (Expanded 3Rs Regulations) and 5 (Expanded 3Rs Regulations with Organics) were ranked equally as the second highest. While there are differences among the three systems, these differences are not significant enough or the magnitude too uncertain to rank one system ahead of the others. Systems 3 and 4 introduce similar amounts of regulation on the IC&I sector. System 4 also has the second highest potential for developing direct employment and economic development opportunities, while System 5 has the greatest potential. The regulation placed on the IC&I sector in System 5 places additional requirements on the restaurant and grocery sectors with potential negative financial and operational implications. This System also has the second least potential to positively affect corporate and employee behaviour.

System 1 (Existing) was ranked the third highest because it has the third least potential to positively affect corporate and employee behaviour, and has the least potential to develop direct employment and economic development opportunities.

System 6 (No Unprocessed Waste to Landfill) was ranked the lowest. It introduces the greatest amount of regulation on the IC&I sector and is likely to result in the greatest increase in costs and operational requirements to the largest number of IC&I generators. However, it has the greatest potential for direct employment and economic development opportunities.

TABLE 12.4

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
Potential for Broad Social Impact (con't)	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects on the IC&I sector	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects; restricted mainly to major IC&I who can accommodate the requirements	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour and operations	· potential to positively affect IC&I attitudes, behaviour and operations · potential for negative affect on operation of many IC&I from source separation of wet waste
Distribution of Social Costs and Benefits	Second highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations · positive effect on distribution of regulation	Highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Avoids smallest businesses, but is broadly based	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Additional requirement for some IC&I	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential for high positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Affects everyone, but appear to be few provisions for small businesses

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The systems were evaluated based on their potential positive and negative social impacts on the GTA's broad social environment in terms of the lifestyle of employees and organizations (corporate culture), and the direct employment and economic development opportunities.

System 2 (Existing/Committed) was ranked the highest because it applies primarily to the major IC&I operations; those which are best able to pay additional costs. It also will likely have the greatest potential to positively affect IC&I attitudes, perceptions and behaviour, because the regulations in this System have been incorporated as a part of normal operations into some institutions, businesses and industry. Over a longer period of time, other operators are likely to comply voluntarily with some of the regulations. However, it has the second least potential to develop direct employment and economic development opportunities.

Systems 3 (Extended 3Rs Regulations), 4 (Expanded 3Rs Regulations) and 5 (Expanded 3Rs Regulations with Organics) were ranked equally as the second highest. While there are differences among the three systems, these differences are not significant enough or the magnitude too uncertain to rank one system ahead of the others. Systems 3 and 4 introduce similar amounts of regulation on the IC&I sector. System 4 also has the second highest potential for developing direct employment and economic development opportunities, while System 5 has the greatest potential. The regulation placed on the IC&I sector in System 5 places additional requirements on the restaurant and grocery sectors with potential negative financial and operational implications. This System also has the second least potential to positively affect corporate and employee behaviour.

System 1 (Existing) was ranked the third highest because it has the third least potential to positively affect corporate and employee behaviour, and has the least potential to develop direct employment and economic development opportunities.

System 6 (No Unprocessed Waste to Landfill) was ranked the lowest. It introduces the greatest amount of regulation on the IC&I sector and is likely to result in the greatest increase in costs and operational requirements to the largest number of IC&I generators. However, it has the greatest potential for direct employment and economic development opportunities.

TABLE 12.4

GTA IC&I
IC&I SYSTEMS RANKING
SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 No Unprocessed Waste to Landfill
Potential for Broad Social Impact (con't)	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects on the IC&I sector	· potential to positively affect IC&I attitudes, behaviour and operations · minor negative operational effects; restricted mainly to major IC&I who can accommodate the requirements	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour, and operations	· potential to positively affect IC&I attitudes, behaviour and operations	· potential to positively affect IC&I attitudes, behaviour and operations · potential for negative affect on operation of many IC&I from source separation of wet waste
Distribution of Social Costs and Benefits	Second highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations · positive effect on distribution of regulation	Highest ranked due to: · potential for negative distribution effects from facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Avoids smallest businesses, but is broadly based	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Second highest ranked due to: · potential for negative distribution effects from facilities with less facilities required and less potential community effects · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. May avoid smallest businesses, is broadly based, but may include small to medium sized businesses	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Additional requirement for some IC&I	Lowest ranked due to: · potential for negative distribution effects from facilities, in particular compost facilities · potential for high positive effect for future generations (magnitude uncertain) · positive distribution regulation effect. Affects everyone, but appear to be few provisions for small businesses

12.5.2 Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the GTA's broad social environment in terms of the lifestyle of employees and organizations (corporate culture), and the direct employment and economic development opportunities.

System 2 (Existing/Committed) was ranked the highest because it applies primarily to the major IC&I operations; those which are best able to pay additional costs. It also will likely have the greatest potential to positively affect IC&I attitudes, perceptions and behaviour, because the regulations in this System have been incorporated as a part of normal operations into some institutions, businesses and industry. Over a longer period of time, other operators are likely to comply voluntarily with some of the regulations. However, it has the second least potential to develop direct employment and economic development opportunities.

Systems 3 (Extended 3Rs Regulations), 4 (Expanded 3Rs Regulations) and 5 (Expanded 3Rs Regulations with Organics) were ranked equally as the second highest. While there are differences among the three systems, these differences are not significant enough or the magnitude too uncertain to rank one system ahead of the others. Systems 3 and 4 introduce similar amounts of regulation on the IC&I sector. System 4 also has the second highest potential for developing direct employment and economic development opportunities, while System 5 has the greatest potential. The regulation placed on the IC&I sector in System 5 places additional requirements on the restaurant and grocery sectors with potential negative financial and operational implications. This System also has the second least potential to positively affect corporate and employee behaviour.

System 1 (Existing) was ranked the third highest because it has the third least potential to positively affect corporate and employee behaviour, and has the least potential to develop direct employment and economic development opportunities.

System 6 (No Unprocessed Waste to Landfill) was ranked the lowest. It introduces the greatest amount of regulation on the IC&I sector and is likely to result in the greatest increase in costs and operational requirements to the largest number of IC&I generators. However, it has the greatest potential for direct employment and economic development opportunities.

12.5.3 Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups and changes in corporate behaviour in the region and on future generations.

System 2 (Existing/Committed) was ranked the highest because it has the least potential for negative distribution effects from facilities and has the potential for positive effect on future generations due to changes in corporate and employee behaviour. It also has a positive distribution effect because the regulations are broadly based across different sectors but avoid small businesses which are least able to pay for the programs.

Systems 1 (Existing), 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked equally as the second highest. System 1 has the least potential for negative distribution effects from facilities and the second most positive effect on distribution of regulation, but has the least potential positive effect for future generations as it does not appear that it will alter IC&I behaviour in the long term to the extent that the other systems will. Systems 3 and 4 have the third most potential for negative distribution effects from facilities, but also have the second most positive distribution effect. It is likely that they will have similar potential positive future generational effects.

Systems 5 (Expanded 3Rs Regulations with Organics) and 6 (No Unprocessed Waste to Landfill) were ranked equally as the lowest. System 6 is likely to have the most potential for negative distribution effects from facilities, but System 5 may have the least positive distribution effect from regulations. The potential for positive effect for future generations is uncertain.

12.5.4 Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings (noting that all criteria are ranked equally), an overall system ranking can be completed for the Social Impact criteria group. The evaluation considered trade-offs among the rankings for each system and criterion, recognizing that there may be significant potential effects from the 3Rs systems and that the potential effects for each criterion may occur throughout the life of the system.

System 2 (Existing/Committed) was ranked as the highest System overall. It ranked the highest for all three criteria.

System 1 (Existing), System 3 (Extended 3Rs Regulations), and System 4 (Expanded 3Rs Regulations) were ranked equally as the second highest overall. While Systems 3 and 4 were ranked the second highest for all three criteria, System 1 was ranked the highest for Potential Local Community Impacts, second highest for Distribution of Social Costs and Benefits and the third highest for Potential for Broad Social Impact. Therefore, the Systems were ranked equal.

System 5 (Expanded 3Rs Regulations with Organics) was ranked as the second lowest overall on the basis that it was the second highest for the Potential for Broad Social Impact, second lowest ranked for Potential Local Community Impacts and lowest for Distribution of Social Costs and Benefits.

System 6 (No Unprocessed Waste to Landfill) was ranked the lowest, because it was ranked the lowest for all three criteria.

A list of the overall IC&I system ranking for the Social Environment criteria group follows (highest ranked to lowest ranked):

1 - System 2 (Existing/Committed)
2 - System 1 (Existing)
2 - System 3 (Extended 3Rs Regulations)
2 - System 4 (Expanded 3Rs Regulations)
5 - System 5 (Expanded 3Rs Regulations with Organics)
6 - System 6 (No Unprocessed Waste to Landfill)

13.0 REGIONAL DIVERSION ESTIMATES

13.1 General

The previous sections discussed diversion estimates for six residential waste diversion systems in each of the Regions of Durham, Metro Toronto, York and Peel, and six IC&I systems for the GTA under the performance indicator of the Service criteria group. The disposal requirements for each Region could vary depending on which residential and IC&I systems are combined to form a waste diversion system. Any of the five potential residential systems (Existing/Committed, Direct Cost, Expanded Blue Box, Wet/Dry, and Mixed Waste) could be combined with any of the five potential IC&I systems (Existing/Committed, Extended 3Rs Regulations, Expanded 3Rs Regulations, Expanded 3Rs Regulations with Organics, and No Unprocessed Waste to Landfill) resulting in 25 possible combinations of residential and IC&I systems for each Region.[1]

The cumulative tonnes of waste diverted through reduction and reuse/recycling, and the cumulative diversion (expressed as a percentage of total waste generated) achieved during the 20-year period from 1996 to 2015 was estimated for the 25 potential system combinations for each of the three service areas (Peel, Durham, Metro/York). Tables 13.1 to 13.5 show the results of this analysis for the Regions of Durham, Metro Toronto, York, Metro and York combined, and Peel. The results are discussed on a regional basis in Sections 13.1 to 13.5.

The source reduction assumptions used in each residential and IC&I system are the same. Therefore the cumulative twenty year reduction of approximately 8% will be the same for all system combinations on a regional basis. The small difference in the cumulative source reduction estimate from one region to another is related to differences in the population and employment growth profiles among the regions. For presentation purposes, all estimates are rounded off to the nearest whole number. Source reduction for residential systems is summarized in Section 13.1.1 and in Section 12.1.2 for IC&I systems. Both are explained in detail in Chapter 5 of this document.

The resulting 20 year cumulative diversion estimates are discussed by region in the following sections.

[1] The residential and IC&I Existing systems have not been combined with other systems as both the residential and IC&I Existing/Committed systems will be in place by 1996.

TABLE 13.1
REGION OF DURHAM
SUMMARY OF DIVERSION DATA FOR COMBINATIONS OF RESIDENTIAL AND IC&I SYSTEMS

Scenario		Cumulative Diversion (2015)					
		Reduction		Reuse/Recycling		Total Diversion	
Residential	IC&I	%	tonnes (millions)	%	tonnes (millions)	%	tonnes (millions)
Existing/ Committed	Existing/ Committed	8%	0.86	30%	3.18	38%	4.05
	Extended 3Rs	8%	0.86	37%	3.87	45%	4.73
	Expanded 3Rs	8%	0.86	41%	4.35	49%	5.21
	Expanded 3Rs with Organics	8%	0.86	45%	4.72	53%	5.58
	No Unprocessed Waste to Landfill	8%	0.86	45%	4.79	54%	5.65
Direct Cost	Existing/ Committed	8%	0.86	35%	3.71	43%	4.58
	Extended 3Rs	8%	0.86	42%	4.40	50%	5.27
	Expanded 3Rs	8%	0.86	46%	4.88	55%	5.74
	Expanded 3Rs with Organics	8%	0.86	50%	5.25	58%	6.11
	No Unprocessed Waste to Landfill	8%	0.86	51%	5.32	59%	6.19
Expanded Blue Box	Existing/ Committed	8%	0.86	36%	3.76	44%	4.62
	Extended 3Rs	8%	0.86	42%	4.45	50%	5.31
	Expanded 3Rs	8%	0.86	47%	4.92	55%	5.79
	Expanded 3Rs with Organics	8%	0.86	50%	5.29	58%	6.16
	No Unprocessed Waste to Landfill	8%	0.86	51%	5.36	59%	6.23
Wet/Dry	Existing/ Committed	8%	0.86	40%	4.23	48%	5.10
	Extended 3Rs	8%	0.86	47%	4.92	55%	5.79
	Expanded 3Rs	8%	0.86	51%	5.40	59%	6.26
	Expanded 3Rs with Organics	8%	0.86	55%	5.77	63%	6.63
	No Unprocessed Waste to Landfill	8%	0.86	55%	5.84	64%	6.70
Mixed Waste Processing	Existing/ Committed	8%	0.86	42% 49%	4.41 5.12	50% 57%	5.27 5.98
	Extended 3Rs	8%	0.86	48% 55%	5.10 5.81	57% 63%	5.96 6.67
	Expanded 3Rs	8%	0.86	53% 60%	5.57 6.28	61% 68%	6.44 7.15
	Expanded 3Rs with Organics	8%	0.86	56% 63%	5.94 6.65	65% 71%	6.81 7.52
	No Unprocessed Waste to Landfill	8%	0.86	57% 64%	6.01 6.73	65% 72%	6.88 7.59

Notes:
1. Low and High diversion estimates are shown for the Mixed Waste Processing System representing the cases when compost is landfilled and when it is marketed.

TABLE 13.2
METRO TORONTO
SUMMARY OF DIVERSION DATA FOR COMBINATIONS OF RESIDENTIAL AND IC&I SYSTEMS

Scenario		Cumulative Diversion (2015)					
		Reduction		Reuse/Recycling		Total Diversion	
Residential	IC&I	%	tonnes (millions)	%	tonnes (millions)	%	tonnes (millions)
Existing/ Committed	Existing/ Committed	8%	4.73	26%	15.02	34%	19.75
	Extended 3Rs	8%	4.73	32%	18.63	41%	23.37
	Expanded 3Rs	8%	4.73	37%	21.13	45%	25.87
	Expanded 3Rs with Organics	8%	4.73	40%	23.07	48%	27.80
	No Unprocessed Waste to Landfill	8%	4.73	41%	23.45	49%	28.18
Direct Cost	Existing/ Committed	8%	4.73	30%	17.06	38%	21.79
	Extended 3Rs	8%	4.73	36%	20.67	44%	25.41
	Expanded 3Rs	8%	4.73	40%	23.17	49%	27.91
	Expanded 3Rs with Organics	8%	4.73	44%	25.11	52%	29.84
	No Unprocessed Waste to Landfill	8%	4.73	44%	25.49	53%	30.22
Expanded Blue Box	Existing/ Committed	8%	4.73	31%	17.91	39%	22.64
	Extended 3Rs	8%	4.73	38%	21.52	46%	26.25
	Expanded 3Rs	8%	4.73	42%	24.02	50%	28.75
	Expanded 3Rs with Organics	8%	4.73	45%	25.96	53%	30.69
	No Unprocessed Waste to Landfill	8%	4.73	46%	26.34	54%	31.07
Wet/Dry	Existing/ Committed	8%	4.73	36%	20.50	44%	25.23
	Extended 3Rs	8%	4.73	42%	24.11	50%	28.84
	Expanded 3Rs	8%	4.73	46%	26.61	55%	31.34
	Expanded 3Rs with Organics	8%	4.73	50%	28.55	58%	33.28
	No Unprocessed Waste to Landfill	8%	4.73	50%	28.93	59%	33.66
Mixed Waste Processing	Existing/ Committed	8%	4.73	39% 47%	22.55 27.22	48% 56%	27.28 31.95
	Extended 3Rs	8%	4.73	46% 54%	26.16 30.83	54% 62%	30.90 35.57
	Expanded 3Rs	8%	4.73	50% 58%	28.66 33.33	58% 66%	33.40 38.07
	Expanded 3Rs with Organics	8%	4.73	53% 61%	30.60 35.27	62% 70%	35.33 40.00
	No Unprocessed Waste to Landfill	8%	4.73	54% 62%	30.98 35.65	62% 70%	35.71 40.38

Notes:
1. Low and High diversion estimates are shown for the Mixed Waste Processing System representing the cases when compost is landfilled and when it is marketed

TABLE 13.3
REGION OF YORK
SUMMARY OF DIVERSION DATA FOR COMBINATIONS OF RESIDENTIAL AND IC&I SYSTEMS

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	%		tonnes (millions)		%		tonnes (millions)	
Existing/ Committed	Existing/ Committed	8%	1.68	30%		5.94		38%		7.62	
	Extended 3Rs	8%	1.68	37%		7.44		46%		9.12	
	Expanded 3Rs	8%	1.68	43%		8.48		51%		10.16	
	Expanded 3Rs with Organics	8%	1.68	47%		9.29		55%		10.96	
	No Unprocessed Waste to Landfill	8%	1.68	48%		9.44		56%		11.12	
Direct Cost	Existing/ Committed	8%	1.68	34%		6.80		43%		8.48	
	Extended 3Rs	8%	1.68	42%		8.30		50%		9.98	
	Expanded 3Rs	8%	1.68	47%		9.34		55%		11.02	
	Expanded 3Rs with Organics	8%	1.68	51%		10.15		59%		11.82	
	No Unprocessed Waste to Landfill	8%	1.68	52%		10.30		60%		11.98	
Expanded Blue Box	Existing/ Committed	8%	1.68	34%		6.85		43%		8.53	
	Extended 3Rs	8%	1.68	42%		8.35		50%		10.03	
	Expanded 3Rs	8%	1.68	47%		9.39		56%		11.07	
	Expanded 3Rs with Organics	8%	1.68	51%		10.19		60%		11.87	
	No Unprocessed Waste to Landfill	8%	1.68	52%		10.35		61%		12.03	
Wet/Dry	Existing/ Committed	8%	1.68	38%		7.65		47%		9.32	
	Extended 3Rs	8%	1.68	46%		9.15		54%		10.83	
	Expanded 3Rs	8%	1.68	51%		10.19		60%		11.86	
	Expanded 3Rs with Organics	8%	1.68	55%		10.99		64%		12.67	
	No Unprocessed Waste to Landfill	8%	1.68	56%		11.15		65%		12.83	
Mixed Waste Processing	Existing/ Committed	8%	1.68	39%	45%	7.78	8.87	48%	53%	9.46	10.54
	Extended 3Rs	8%	1.68	47%	52%	9.28	10.37	55%	61%	10.96	12.04
	Expanded 3Rs	8%	1.68	52%	57%	10.32	11.40	60%	66%	12.00	13.08
	Expanded 3Rs with Organics	8%	1.68	56%	61%	11.13	12.21	64%	70%	12.80	13.89
	No Unprocessed Waste to Landfill	8%	1.68	57%	62%	11.28	12.37	65%	71%	12.96	14.04

Notes:
1. Low and High diversion estimates are shown for the Mixed Waste Processing System representing the cases when compost is landfilled and when it is marketed

TABLE 13.4
METRO TORONTO AND REGION OF YORK COMBINED SUMMARY OF DIVERSION DATA FOR COMBINATIONS OF RESIDENTIAL AND IC&I SYSTEMS

Scenario		Cumulative Diversion (2015)					
		Reduction		Reuse/Recycling		Total Diversion	
Residential	**IC&I**	**%**	**tonnes (millions)**	**%**	**tonnes (millions)**	**%**	**tonnes (millions)**
Existing/ Committed	**Existing/ Committed**	8%	6.41	27%	20.96	35%	27.37
	Extended 3Rs	8%	6.41	34%	26.08	42%	32.49
	Expanded 3Rs	8%	6.41	38%	29.62	47%	36.02
	Expanded 3Rs with Organics	8%	6.41	42%	32.36	50%	38.77
	No Unprocessed Waste to Landfill	8%	6.41	43%	32.90	51%	39.30
Direct Cost	**Existing/ Committed**	8%	6.41	31%	23.86	39%	30.27
	Extended 3Rs	8%	6.41	38%	28.98	46%	35.39
	Expanded 3Rs	8%	6.41	42%	32.52	50%	38.92
	Expanded 3Rs with Organics	8%	6.41	46%	35.26	54%	41.67
	No Unprocessed Waste to Landfill	8%	6.41	46%	35.80	55%	42.20
Expanded Blue Box	**Existing/ Committed**	8%	6.41	32%	24.76	40%	31.16
	Extended 3Rs	8%	6.41	39%	29.87	47%	36.28
	Expanded 3Rs	8%	6.41	43%	33.41	52%	39.82
	Expanded 3Rs with Organics	8%	6.41	47%	36.15	55%	42.56
	No Unprocessed Waste to Landfill	8%	6.41	47%	36.69	56%	43.10
Wet/Dry	**Existing/ Committed**	8%	6.41	36%	28.14	45%	34.55
	Extended 3Rs	8%	6.41	43%	33.26	51%	39.67
	Expanded 3Rs	8%	6.41	48%	36.80	56%	43.21
	Expanded 3Rs with Organics	8%	6.41	51%	39.54	59%	45.95
	No Unprocessed Waste to Landfill	8%	6.41	52%	40.08	60%	46.48
Mixed Waste Processing	**Existing/ Committed**	8%	6.41	39% 47%	30.33 36.09	48% 55%	36.74 42.49
	Extended 3Rs	8%	6.41	46% 53%	35.45 41.20	54% 62%	41.86 47.61
	Expanded 3Rs	8%	6.41	50% 58%	38.99 44.74	59% 66%	45.39 51.15
	Expanded 3Rs with Organics	8%	6.41	54% 61%	41.73 47.48	62% 70%	48.14 53.89
	No Unprocessed Waste to Landfill	8%	6.41	55% 62%	42.27 48.02	63% 70%	48.67 54.43

Notes:
1. Low and High diversion estimates are shown for the Mixed Waste Processing System representing the cases when compost is landfilled and when it is marketed

TABLE 13.5
REGION OF PEEL
SUMMARY OF DIVERSION DATA FOR COMBINATIONS OF RESIDENTIAL AND IC&I SYSTEMS

Scenario		Cumulative Diversion (2015)					
		Reduction		Reuse/Recycling		Total Diversion	
Residential	IC&I	%	tonnes (millions)	%	tonnes (millions)	%	tonnes (millions)
Existing/ Committed	Existing/ Committed	8%	1.84	28%	6.95	36%	8.79
	Extended 3Rs	8%	1.84	36%	8.69	43%	10.53
	Expanded 3Rs	8%	1.84	40%	9.89	48%	11.73
	Expanded 3Rs with Organics	8%	1.84	44%	10.82	52%	12.66
	No Unprocessed Waste to Landfill	8%	1.84	45%	11.00	53%	12.84
Direct Cost	Existing/ Committed	8%	1.84	32%	7.92	40%	9.76
	Extended 3Rs	8%	1.84	39%	9.66	47%	11.50
	Expanded 3Rs	8%	1.84	44%	10.86	52%	12.70
	Expanded 3Rs with Organics	8%	1.84	48%	11.79	56%	13.63
	No Unprocessed Waste to Landfill	8%	1.84	49%	11.97	56%	13.81
Expanded Blue Box	Existing/ Committed	8%	1.84	33%	8.09	41%	9.93
	Extended 3Rs	8%	1.84	40%	9.82	48%	11.66
	Expanded 3Rs	8%	1.84	45%	11.03	53%	12.86
	Expanded 3Rs with Organics	8%	1.84	49%	11.96	56%	13.80
	No Unprocessed Waste to Landfill	8%	1.84	50%	12.14	57%	13.98
Wet/Dry	Existing/ Committed	8%	1.84	37%	8.95	44%	10.79
	Extended 3Rs	8%	1.84	44%	10.69	51%	12.52
	Expanded 3Rs	8%	1.84	49%	11.89	56%	13.73
	Expanded 3Rs with Organics	8%	1.84	52%	12.82	60%	14.66
	No Unprocessed Waste to Landfill	8%	1.84	53%	13.00	61%	14.84
Mixed Waste Processing	Existing/ Committed	8%	1.84	39% 46%	9.60 11.24	47% 54%	11.44 13.08
	Extended 3Rs	8%	1.84	46% 53%	11.34 12.98	54% 61%	13.17 14.82
	Expanded 3Rs	8%	1.84	51% 58%	12.54 14.18	59% 66%	14.38 16.02
	Expanded 3Rs with Organics	8%	1.84	55% 62%	13.47 15.12	63% 69%	15.31 16.95
	No Unprocessed Waste to Landfill	8%	1.84	56% 63%	13.65 15.30	63% 70%	15.49 17.14

Note:
1. Low and High diversion estimates are shown for the Mixed Waste System representing the cases when compost is landfilled and when it is marketed

13.1.1 Residential Sector Source Reduction

A conservative residential source reduction estimate increasing from 0% in 1992 to approximately 3% by the year 2000, and increasing in increments of approximately 0.35% per year from the year 2000 to 2015 was applied to the residential waste generation estimates. The source reduction value was considered reasonable based on the likely impacts of NAPP on packaging waste, and some increases in reuse activities; this is estimated to result in an overall 8% source reduction of residential waste by the year 2015.

13.1.2 IC&I Sector Source Reduction

Source reduction by the IC&I sector is attributed to three factors:

- changes in economic activity and the employment profile of each Region;
- innovation leading to reduced waste generation, (assumed to increase by an annual increment of 0.5% from 1993 to 2015);
- improved waste management practices in the C&D sector (assumed to increase by an annual increment of 0.25% per year from 1993 to 2015).

13.2 Region of Durham

Table 13.1 shows that the 25 combinations of residential and IC&I systems are estimated to divert a range of 4.05 million to 7.59 million tonnes of waste in the Region of Durham between 1996 and 2015. This represents a range of 38% to 72% of the Durham waste stream.

The combination of Existing/Committed Residential (System 2) and Existing/Committed IC&I (System 2) is estimated to result in the lowest potential waste diversion for this region. This combination is estimated to divert 38% of the combined waste stream generated (4 million tonnes) between 1996 and 2015, achieved by the year 2015, consisting of:

- 3.18 million tonnes (30%) of waste reused/recycled; and
- 0.86 million tonnes (8%) of waste reduced.

Other combinations of residential and IC&I systems are estimated to achieve higher diversions. The highest estimated diversion is achieved by combining Mixed Waste Processing of residential waste (Residential System 6A and 6B) with a policy of No Unprocessed Waste to Landfill for IC&I waste (IC&I System 6). This combination is estimated to divert between 65% and 72% of the combined waste stream (between 6.88 to 7.59 million tonnes) in the twenty year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 19 are estimated to divert at least 50% of waste generated over the 20 year planning period. There are also two system combinations that are estimated to divert 48% and 49%. Almost one fifth (8% of the waste stream) of the diversion is estimated to occur through source reduction, which requires a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

13.3 Metro Toronto

Table 13.2 shows that the 25 combinations of residential and IC&I systems are estimated to divert a range of 19.75 million to 40.38 million tonnes of waste in Metro Toronto between 1996 and 2015. This represents a range of 34% to 70% of the Metro Toronto waste stream.

The combination of Existing/Committed Residential (System 2) and Existing/Committed IC&I (System 2) is estimated to result in the lowest potential waste diversion for this region. This combination is estimated to divert 34% of the combined waste stream generated (19.75 million tonnes) between 1996 and 2015 consisting of:

- 15.02 million tonnes (26%) of waste reused/recycled; and
- 4.73 million tonnes (8%) of waste reduced.

Other combinations of residential and IC&I systems are estimated to achieve higher diversions. The highest estimated diversion is achieved by a combination of Mixed Waste Processing of residential waste (Residential System 6A and 6B) with a policy of No Unprocessed Waste to Landfill for IC&I waste (IC&I System 6). This combination is estimated to divert between 62% and 70% (35.71 to 40.38 million tonnes) in the twenty year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 13 are estimated to divert at least 50% of waste generated over the 20 year planning period. Additional 4 system combinations are estimated to divert 48% or 49% of the total waste stream. Almost one fifth (8% of the waste stream) of the diversion is estimated to occur through source reduction, which requires a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

13.4 Region of York

Table 13.3 shows that the 25 combinations of residential and IC&I systems are estimated to divert a range of 7.62 million to 14.04 million tonnes of waste in Region of York between 1996 and 2015. This represents a range of 38% to 71% of the Region of York waste stream.

The combination of Existing/Committed Residential (System 2) and Existing/Committed IC&I (System 2) is estimated to result in the lowest potential waste diversion for this region. This combination is estimated to divert 38% (7.62 million tonnes) of the waste generated between 1996 and 2015, consisting of:

- 5.94 million tonnes (30%) of waste reused/recycled; and
- 1.68 million tonnes (8%) of waste reduced.

Other combinations of residential and IC&I systems are estimated to achieve higher diversions. The highest estimated diversion is achieved by combining Mixed Waste Processing of residential waste with a policy of No Unprocessed Waste to Landfill for IC&I waste (System 6). This combination is estimated to divert between 65% and 71% of the waste stream (12.96 to 14.04 million tonnes) in the twenty year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 19 are estimated to divert at least 50% of waste generated over the 20 year planning period. Almost one-fifth (8% of the waste stream) of the diversion is estimated to occur through source reduction, which requires a sustained promotion, education, and support program which focuses on source reduction by both the residential and IC&I sectors.

13.5 Combined Metro Toronto and Region of York

Table 13.4 shows that the 25 combinations of residential and IC&I systems are estimated to divert a range of 27.37 million to 54.43 million tonnes of waste in Metro Toronto and Region of York combined between 1996 and 2015. This represents a range of 35% to 70% of the combined waste stream from the two regions, which make up one service area.

The combination of Existing/Committed Residential (System 2) and Existing/Committed IC&I (System 2) is estimated to result in the lowest waste diversion for this combined service area. This combination is estimated to divert 35% of the waste generated (27.37 million tonnes) between 1996 and 2015, consisting of:

- 20.96 million tonnes (27%) of waste reused/recycled;
- 6.41 million tonnes (8%) of waste reduced.

Other combinations of residential and IC&I systems are estimated to achieve higher diversions. The highest estimated diversion is achieved by combining Mixed Waste Processing of residential waste with a policy of No Unprocessed Waste to Landfill for IC&I waste (System 6). This combination is estimated to divert between 63% and 70% of the combined waste stream (48.67 to 54.43 million tonnes) in the twenty year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 16 are estimated to divert at least 50% of waste generated over the 20 year planning period. Almost one fifth (8% of the waste stream) of the diversion is estimated to occur through source reduction which requires a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

13.6 Region of Peel

Table 13.5 shows that the 25 combinations of residential and IC&I systems are estimated to divert a range of 8.79 million to 17.14 million tonnes of waste in Region of Peel between 1996 and 2015. This represents a range of 36% to 70% of the Region of Peel waste stream.

The combination of Existing/Committed Residential (System 2) and Existing/Committed IC&I (System 2) is estimated to result in the lowest potential waste diversion for this

region. This combination is estimated to divert 36% of waste generated (8.79 million tonnes) between 1996 and 2015, consisting of:

- 6.95 million tonnes (28%) of waste reused/recycled; and
- 1.84 million tonnes (8%) of waste reduced.

Other combinations of residential and IC&I systems are estimated to achieve higher diversions. The highest estimated diversion is achieved by combining Mixed Waste Processing of residential waste (System 6A and 6B) with a policy of No Unprocessed Waste to Landfill for IC&I waste (System 6). This combination is estimated to divert 63% to 70% (15.49 to 17.14 million tonnes) of the combined waste stream in the twenty year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 16 are estimated to divert at least 50% of waste generated over the 20 year planning period. There are also two system combinations which are estimated to divert 48% of the total waste stream. A portion (8% of the waste stream) of the diversion is estimated to occur through source reduction, which requires a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

13.7 Conclusion

The diversion impacts of a range of residential and IC&I systems were estimated for the three service areas for which landfills are proposed by the Interim Waste Authority. The estimates show that of the 25 combinations considered, at least 16 are estimated to divert 50% or more of the generated waste stream in the 20 year period between 1996 and 2015. All estimates have assumed that up to one-fifth of the diversion will be achieved through source reduction by the residential and IC&I sectors. A sustained promotion, education and support program for source reduction would help achieve this result.

The actual level of waste diversion achieved in each of the primary service areas will be influenced by a number of factors including the diversion approach pursued in each Region as well as external influences. These external influences will impact on both the generation and diversion of waste by the residential and IC&I sectors. The external influences include factors such as economic growth, our international competitiveness, the value of the Canadian dollar, the continued availability of an inexpensive export option for waste disposal, and the creation of stable sustainable end markets for secondary materials.

14.0 SUMMARY AND CONCLUSIONS

Section 15 of *Waste Management Act*, 1992 (WMA) stipulates that the environmental assessments for the IWA landfill waste disposal sites are to contain, among other matters, a description of, a statement of rationale for, and a description and evaluation of any matter relating to reduction, reuse and recycling of waste (3Rs) as an alternative to the landfill waste disposal sites. This report meets that requirement.

The Act (Section 14) also stipulates that for each site proposed by the IWA as an undertaking, the Minister of Environment and Energy is to provide a written estimate to the IWA as to the amount of waste expected to be diverted from the proposed landfill waste disposal site by waste reduction, and by waste reuse and recycling. These estimates were provided by Minister's letter dated May 15, 1992. This report provides additional analysis of 3Rs activities in support of the reasonableness of the waste diversion estimates previously provided.

While the WMA treats reduction, reuse and recycling as specific waste management practices, they are more properly broad labels for a range of waste management practices. To meet the objectives and requirements of the WMA, a more refined examination was conducted of 3Rs specific approaches which are reasonable for the three primary service areas under consideration. In this report, these are termed 3Rs system alternatives. These 3Rs system alternatives are analyzed and evaluated to demonstrate the range of effects which may be expected from reduction, reuse and recycling as an alternative to landfill waste disposal.

In conducting the 3Rs study, and providing estimates of waste that will not require disposal in the IWA established sites, MOEE is acting as a reliable authority in accordance with its legislative mandate, and not as the proponent or co-proponent of any of the 3Rs systems discussed. The alternatives presented in this report are not in any way structured as detailed implementation plans for the Province, the Regions or the private sector.

The following summarizes the results of the analysis.

14.1 Evaluation of 3Rs

As documented in this report, the GTA 3Rs Analysis:

- considered a reasonable range of 3Rs alternatives;
- considered the full definition of the environment;
- systematically evaluated the net effects of the options being considered; and
- considered public views on waste diversion.

14.1.1 3Rs System Alternatives

Through a systematic process as previously discussed in this report, alternative 3Rs systems were developed comprising of combinations of 3Rs programs, technologies and practices that could reasonably be implemented in the GTA. The alternative systems were designed to evaluate the relative effectiveness of different "core" components. These "core" components are not mutually exclusive and could be blended to produce different system designs which might be more effective for a given municipality or for the private sector.

Including the Existing (in place as of December 31, 1992) and Existing/Committed system, six residential and six IC&I 3Rs systems were developed. The number of potential systems which could be developed from combinations of system components is very large. The systems which were developed were those considered to be reasonable for implementation in the GTA. There were no "red herrings", i.e. systems deemed impractical or unreasonable. In addition to the system combination possibilities, there is a wide menu of "enhancement" components presented in Section 8.6.2 which can be drawn upon to improve the performance of any given system.

The residential systems were developed specific to the four municipalities of the GTA whereas the IC&I 3Rs systems were applied to the GTA as a whole. This study did not attempt to develop an optimal system for each service area as that would require site-specific analysis and policy considerations beyond the scope of this study. Development of a preferred system for implementation in each service area is more appropriately done by the responsible municipal authorities who can take into account site-specific issues and their specific circumstances.

14.1.2 Net Effects Evaluation

Based on the Cost, Municipal Finance, Natural Environment, Service and Social Environment criteria groups, net effects were determined for each of the alternative 3Rs systems.

The net effects analysis of 3Rs components was not specific to regional conditions, rather it generically developed the effects and mitigation associated with the components of each system in the context of the larger GTA.

The components and their net effects were then combined into regionally-based 3Rs systems to create the net effects analysis for each residential 3Rs system for each Region. For the IC&I system, the net effects analysis remained at the GTA level. The net effects generated were then used to identify advantages and disadvantages to the environment, and comparatively rank the 3Rs systems within each criteria group. Tables 14.1 to 14.5 summarize the 3Rs system rankings.

TABLE 14.1
DURHAM 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups					
		Cost	Municipal Finance		Natural Environment	Service	Social
1	Existing	1		1	1	4	5
2	Existing/Committed	1		2	1	4	4
3	Direct Cost	1	A	3	4	2	2
			B	5			
4	Expanded Blue Box	1		3	1	1	1
5	Wet/Dry	5		6	4	3	3
6A	Mixed Waste Processing (low quality compost)	6		7	6	7	5
6B	Mixed Waste Processing (high quality compost)	6		7	6	4	5

Note: "1" represents highest ranking (low impact).

TABLE 14.2
METRO TORONTO 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups					
		Cost	Municipal Finance		Natural Environment	Service	Social
1	Existing	1		1	1	5	5
2	Existing/Committed	1		1	1	4	2
3	Direct Cost	1	A	1	4	2	2
			B	6			
4	Expanded Blue Box	1		1	1	1	1
5	Wet/Dry	1		1	4	3	4
6A	Mixed Waste Processing (low quality compost)	6		7	6	7	6
6B	Mixed Waste Processing (high quality compost)	6		7	6	5	6

Note: "1" represents highest ranking (low impact).

TABLE 14.3
YORK REGION 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups					
		Cost	Municipal Finance		Natural Environment	Service	Social
1	Existing	1		1	1	5	5
2	Existing/Committed	1		2	1	4	4
3	Direct Cost	1	A	3	4	2	2
			B	5			
4	Expanded Blue Box	1		3	1	1	1
5	Wet/Dry	5		6	4	3	3
6A	Mixed Waste Processing (low quality compost)	6		7	6	6	5
6B	Mixed Waste Processing (high quality compost)	6		7	6	5	5

Note: "1" represents highest ranking (low impact).

ERRATUM

Please note that Table 14.2 located on Page 14-4 has been revised as follows:

TABLE 14.2
METRO TORONTO 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	Municipal Finance	Natural Environment	Service	Social
1	Existing	1	1	1	5	4
2	Existing/Committed	1	1	1	4	2
3	Direct Cost	1	A 1 B 6	4	2	3
4	Expanded Blue Box	1	1	1	1	1
5	Wet/Dry	1	1	4	3	5
6A	Mixed Waste Processing (low quality compost)	6	7	6	7	6
6B	Mixed Waste Processing (high quality compost)	6	7	6	5	6

TABLE 14.4
PEEL REGION 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	Municipal Finance	Natural Environment	Service	Social
1	Existing	1	1	1	5	4
2	Existing/Committed	1	2	1	2	2
3	Direct Cost	1	A 3 B 5	4	2	2
4	Expanded Blue Box	1	3	1	1	1
5	Wet/Dry	5	6	4	4	4
6A	Mixed Waste Processing (low quality compost)	6	7	6	7	6
6B	Mixed Waste Processing (high quality compost)	6	7	6	5	6

Note: "1" represents highest ranking (low impact).

TABLE 14.5
IC&I 3Rs SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	Municipal Finance	Natural Environment	Service	Social
1	Existing	1	1	1	5	2
2	Existing/Committed	1	1	1	3	1
3	Extended 3Rs Regulations	1	1	3	2	2
4	Expanded 3Rs Regulations	1	1	3	1	2
5	Expanded 3Rs Regulations with Organics	1	1	5	4	5
6	No Unprocessed Waste to Landfill	1	1	5	5	6

Note: "1" represents highest ranking (low impact).

14.2 Waste Diversion Estimates

This document provides written estimates on the amount of waste that will not be generated due to waste reduction efforts and the amount of waste which will be diverted from disposal due to reuse or recycling efforts.

The disposal requirements for each service area depend on which residential and IC&I systems are combined to form any waste diversion system. The residential and IC&I 3Rs systems can be combined 25 different ways for each service area.[1] The following summarizes the estimated cumulative tonnes (for the 20-year period 1996-2015) of waste that could be diverted through reduction and reuse/recycling and the cumulative diversion rate (expressed as a percentage of total waste generated) by service area.

It should be noted that the diversion percentages discussed in this section are the cumulative diversion achieved over a 20-year period, from 1996 to 2015. These are different from the values presented in the Summary Net Effects Tables presented in Chapters 7 to 12, which show a one-year "snap shot" of the diversion that could be achieved by any of the residential systems at a Regional level and the IC&I systems at the GTA level in the year 2000, assuming that the system in question is fully operational in the year 2000.

14.2.1 Durham Region

The study has shown that each of the combined Durham Region systems could result in a source reduction of 0.86 million tonnes representing a 8% diversion rate. Through reuse and recycling efforts, 3.18 million to 6.73 million tonnes could reasonably be diverted. This translates to 30% to 64% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Durham Region could divert a range of 4.05 million to 7.59 million tonnes of wastes, or 38% to 72% of the waste stream.

14.2.2 Metro Toronto

The study has shown that each of the combined Metro Toronto 3Rs systems could result in a source reduction of 4.73 million tonnes representing a 8% diversion rate. Through

1 The residential and IC&I Existing systems have not been combined with other systems as both the residential and IC&I Existing/Committed systems will be in place by 1996.

reuse and recycling efforts, 15.02 million to 35.65 million tonnes is estimated to be diverted. This translates to 26% to 62% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Metro Toronto could reasonably divert a range of 19.75 million to 40.38 million tonnes of waste or 34% to 70% of the waste stream.

14.2.3 York Region

The study has shown that each of the combined York Region 3Rs systems could result in a reduction of 1.68 million tonnes representing a 8% diversion rate. Through reuse and recycling efforts, 5.94 million to 12.37 million tonnes is estimated to be diverted. This translates to 30% to 62% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for York Region could reasonably divert a range of 7.62 million to 14.04 million tonnes of waste or 38% to 71% of the waste stream.

14.2.4 Metro Toronto/York Region

The study has shown that each of the combined Metro Toronto/York Region systems could result in a source reduction of 6.41 million tonnes representing a 8% diversion rate. Through reuse and recycling efforts, 20.96 million to 48.02 million tonnes is estimated to be diverted. This translates to 27% to 62% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Metro Toronto/York Region could reasonably divert a range of 27.37 million to 54.43 million tonnes of waste or 35% to 70% of the waste stream.

14.2.5 Peel Region

It is expected that each of the combined Peel Region 3Rs systems will result in a reduction of 1.84 million tonnes representing a 8% diversion rate. Through reuse and recycling efforts, 6.95 million to 15.3 million tonnes is estimated to be diverted. This translates to 28% to 63% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Peel Region could reasonably divert a range of 8.79 million to 17.14 million tonnes of waste or 36% to 70% of the waste stream.

14.2.6 Diversion Estimate Conclusions

The estimates of waste diversion for the three service areas show that of the 25 options considered, 16 have the ability to divert 50% or more of the generated waste stream in the 20-year period between 1996 and 2015.

The analysis shows that the written estimates provided by the MOEE to the IWA in May 1992 fall within the range of diversion achievable by a number of combinations of residential and IC&I systems within each of the service areas.

The systems presented and evaluated were not designed as plans for any of the Regions or service areas. They were chosen to estimate the impacts of a number of different possible approaches to waste diversion. They are not considered a complete list of all the possible combinations of components which could form waste diversion systems, and a comprehensive mix and match of components has not been attempted. The systems were chosen to provide a reasonable range of diversion options, and to estimate the impacts of these options.

LIST OF ACRONYMS

LIST OF ACRONYMS

3Rs	Reduce, reuse, recycle
AIMI	Analytic Information Management Inc.
BFI	Browning-Ferris Industries
C&D	Construction and Demolition
CFC	Chloroflorocarbons
CMA	Census Metropolitan Area
CMHC	Canada Mortgage and Housing Corporation
CPRA	Canadian Polystyrene Recycling Association
D&B	Dunn & Bradstreet
EA	Environmental Assessment
EA Act	Environmental Assessment Act, 1990
EA Process	Environmental Assessment Process
EYC	Environmental Youth Corps
GATT	General Agreements on Tariffs and Trade
GPMC	Grocery Products Manufacturers of Canada
GTA	Greater Toronto Area
GTCC	Greater Toronto Co-ordinating Committee
HDPE	High-Density Polyethylene
HHW	Household Hazardous Waste
IC&I	Industrial, Commercial and Institutional
IFO	Industry Funding Organization
IWA	Interim Waste Authority
LDPE	Low-Density Polyethylene
MARS	Municipal Archive Retrieval System
MOEE	Ministry of Environment and Energy

MRF	Material Recovery Facility
NAFTA	North American Free Trade Agreement
NAPP	National Packaging Protocol
NIC	Newly Industrialized Country
OCC	Old Corrugated Cardboard
OMG	Old Magazines and Catalogues
OMMRI	Ontario Multi Media Recycling Inc.
ONP	Old Newspapers
OWE	Ontario Waste Exchange
OWMA	Ontario Waste Management Association
PET	Polyethylene Terephthalate
PP	Polypropylene
PRRI	Peel Resource Recovery Incorporated
PS	Polystyrene
PJC	Polyvinyl Chloride
RCN	Regional Consultation Network
RCO	Recycling Council of Ontario
RCRA	U.S. Resource Conservation and Recovery Act
RDF	Refuse Derived Fuel
SIC	Standard Industrial Classification
SWEAP	Solid Waste Environmental Assessment Plan
SWISC	Solid Waste Interim Steering Committee
TTC	Toronto Transit Commission
TWR	Thermal Waste Reduction
WCI	Wood Conversions Inc.
WMI	Waste Management Inc.

GLOSSARY OF TERMS

GLOSSARY OF TERMS

3Rs OF WASTE MANAGEMENT	A hierarchy of waste diversion in the following order: 1) Reduce; 2) Reuse; and 3) Recycle.
ALTERNATIVE TO	"Alternatives to" the undertaking (proposed project) are of a functionally different nature than the undertaking.
ANAEROBIC	The biological state of living and growing in the absence of oxygen without the presence of oxygen.
BLUE BOX	A blue plastic box used by residents of many municipalities and rural areas to collect and store recyclable items and to carry these items to the curbside/ roadside for collection.
CENTRALIZED COMPOSTING	The collection and processing of large quantities of organic waste at a central facility to produce compost/ humus; may be in-vessel (closed container), windrow (open air), or other technologies.
CERTIFICATE OF APPROVAL (C of A)	A license or permit issued by the MOEE for the operation of any waste management facility under the *Environmental Protection Act* (also known as a Provisional Certificate of Approval). Issued to the owner of the site with conditions of compliance stated therein.
COMPOSTING	The controlled microbiological decomposition of the organic fraction of solid waste material resulting in a humus-like end-product which is primarily used for soil conditioning.
CURBSIDE RECYCLING	A recycling program in which people separate recyclable materials from general waste and place them at the curbside/roadside for collection.
DEPOT RECYCLING	A facility, large or small, for the temporary storage of recyclable materials; in some areas, used as drop-off locations by the public; in other areas, used only by municipalities to store materials collected by trucks.

EA DOCUMENT (S)	Refers to the document(s) which describe the carrying out of that process resulting in the selection of the preferred alternative and addresses the content requirements of subsection 5(3), EA Act.
ENVIRONMENT	The definition of "environment" in the *Environmental Assessment Act*, which includes the technical, natural, social, economic, and cultural factors, and their interrelationships.
ENVIRONMENTAL ASSESSMENT ACT (EA ACT)	*Environmental Assessment Act*, RSO, 1990. One of the primary acts of legislation intended to protect, conserve and wisely manage Ontario's environment through regulating planning and developing.
EVALUATION	The process of determining the suitability of two or more alternatives on the basis of a common method of comparison.
EVALUATION CRITERIA	A set of broad factors (covering the natural, social, economic, financial, cultural, technical and land-use planning environments) used to determine the suitability of two or more waste management system alternatives and facility/site alternatives on the basis of common method of comparison.
GASIFICATION PLANTS	The processing of waste in a centralized facility for the production of a combustible gas.
GERMAN GREEN DOT SYSTEM	Marking of products to indicate that it will be collected and recycled back into another product by the manufacturer(s).
HOUSEHOLD HAZARDOUS WASTE (HHW)	Substances for household use that are labelled corrosive, flammable, poison, or explosive and should be disposed of properly (not in a landfill site) e.g., paints and batteries.
IC&I WASTE (Industrial, Commercial & Institutional Waste)	Solid waste generated by industries and businesses of all types, including shopping stores, restaurants, hotel/motel establishments, and offices; institutional types of establishments such as schools, hospitals, government offices, and universities. IC&I waste makes up about 60% of Ontario's total municipal solid waste stream.

IGLOOS/DOMES	Collection depot for recyclable materials.
IN-VESSEL	A method of composting in which the compost is mechanically mixed and aerated in a container or enclosed building.
MATERIALS RECOVERY FACILITY (MRF)	A facility where specified materials are intentionally removed from mixed waste or where co-mingled recyclable materials are sorted into distinct categories.
MITIGATION	Techniques for preventing, avoiding or reducing the impact of an environmental problem, such as water pollution caused by the movement of leachate from a landfill site.
MUNICIPAL SOLID WASTE (MSW)	More commonly referred to as garbage, this waste material is handled by municipal collection and/or disposal services. It includes two main types of solid waste: residential (domestic) waste, and industrial, commercial and institutional (IC&I) waste. MSW does not include hazardous and liquid industrial wastes. (See also Residential Waste).
NET EFFECTS ANALYSIS	The residual environmental effects remaining following the consideration of mitigative and enhancement measures of potential effects.
ON-SITE	Areas within which features will be displaced or lost by property purchase and facility development.
RECYCLABLE MATERIAL	A material that is used in place of a primary, raw, or virgin material in manufacturing a product and consists of materials derived from post consumer waste, industrial scrap, and material derived from agricultural wastes and other items, all of which can be used in the manufacture of new products.
RECYCLING	The sorting, collecting and processing of a waste material or product so it can be used for a similar or new purpose. For example, the "Blue Box" system, in-plant scrap handling, or raw material recover systems. Recycling is also the marketing of products made from recycled or recyclable materials. This is the third of the 3Rs.

RECYCLING DEPOT	A facility used for the temporary storage of recyclable materials; in some areas, used as drop-off locations by the public; in other areas, used only by municipalities to store materials collected by trucks.
RECYCLING FACILITY OR PLANT	A facility where recycling of used or waste products is carried out.
REDUCE	To decrease. See 3Rs of Waste Management.
REDUCTION	The avoidance or prevention of waste production through measures or efforts designed to reduce the quantities of waste requiring disposal. A reduction in the quantity of waste produced is achieved through modified consumer practices and changes in industrial production to generate fewer useless by-products. The minimization and prevention of waste through changes in lifestyle habits, product design, procedures, purchasing decisions, etc., the first priority of the 3Rs.
REFUSE	See *Waste*.
REFUSE DERIVED FUEL (RDF)	Refers to any usable fuel produced by mechanically, thermally, chemically, or biologically processing solid waste. Typically, RDF is uniform in size and from which glass, metals, ceramics and other non-combustible materials have usually been removed.

RESIDENTIAL WASTE	Waste produced by all types of households, including detached dwellings, row housing, condominiums and apartments. In Ontario, residential waste makes up about 40 per cent of the total municipal solid waste stream.
REUSABLE PRODUCT	Something which can be used again for the same, similar or different purpose.
REUSE	The return of a product or material to use either by reusing it for its original purpose or by finding a new use for it without modifying it. (See 3Rs of Waste Management). This is the second "R" of the 3Rs.
SCAT MACHINE	Is a brand of windrow turner used in centralized composting operations to turn over and/or move the compost to assist in the composting process.
SCREENING	Elimination of alternatives which do not meet the requirements of specific criteria.
SOLID WASTE	Non-hazardous, unwanted, discarded material.
SOURCE REDUCTION	Reducing the amount of materials entering the waste stream by voluntary or mandatory programs to eliminate the generation of waste. The reduction of waste at point of generation (e.g., a product in bulk containers instead of individual packaging).
SOURCE SEPARATION	The separation of specific materials from the waste stream at their point of generation for the purposes of reuse, recycling or further processing.
STAKEHOLDER	A stakeholder is defined as any resident, industry or institution in the GTA or any government agency which could be affected by the GTA 3Rs systems.
STUDY AREA	The geographic area within the GTA.
THREE STREAM COLLECTION	Refers to a waste collection system where waste is separated at source into wet compostables (yard and possibly food waste), dry recyclable (blue box materials) and waste. The remaining solid waste which is landfilled.

TIPPING FEE	The amount of money charged by the operator of an approved waste management facility for receiving and managing waste. The charge is based on either the weight or volume of the waste. The cost is calculated as a percentage of or equal to the total cost (capital and operating) of the facility.
TOXIC TAXI	Refers to a vehicle used for the collection of HHW from households who request the collection of these wastes.
TUB GRINDER	Used in a centralized composting operations, a tub grinder is used to shear the waste material to assist the composting process.
TROMMEL SCREEN	Used in centralized composting operations, a trommel screen is a large horizontal cylinder which rotates the compost to sort the size of material in the finished compost.
TWO STREAM COLLECTION/ WET DRY PROGRAM	A waste collection system where waste is separated at source into wet compostables and the remainder which is then sorted for recyclable materials at a Materials Recovery Facility (MRF).
VERMI-COMPOSTING	Compost unit which requires worms to aid in the composting process or organics.
WASTE	Ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and other used products as are designated or interpreted by the provisions of the *Environmental Protection Act* (see Garbage.)
WASTE AUDIT	A study of the generation and management of waste, not including liquid industrial waste or hazardous waste.

WASTE MANAGEMENT SYSTEM COMPONENTS	Alternative waste management technologies and/or processes which includes but are not limited to: · reduction/reuse activities; · at-source separation; · mechanized material separation; · transfer stations; · composting; and · landfilling.
WASTE REDUCTION ACTION PLAN (WRAP)	A plan which was announced by the Minister of the Environment on February 21, 1991 containing specific activities aimed at ensuring that Ontario accomplishes its goal of diverting 25 per cent of waste by 1992 and 50 per cent by the year 2000.
WASTE REDUCTION OFFICE (WRO)	Created in February 1991 within the Ministry of the Environment to oversee implementation of Ontario's Waste Reduction Action Plan and other waste reduction initiatives province wide.
WASTE STREAM	The waste generated by a specific source (e.g. residential or IC&I).
WET/DRY RECYCLING	See Two-Stream Recycling
WINDROW	A long row of heaped material left on the ground in a controlled area. In composting, waste material is sometimes made into windrows so that the materials can be easily turned over.

APPENDIX A

MOEE Minister's May 15, 1992 Letter

Ministry of the Environment
Ministère de l'Environnement
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May 15, 1992

Ms. Jan Rush, Chair
Interim Waste Authority,
20 Bay Street, Suite 1625,
Toronto, Ontario.
M5J 2N8

Dear Ms. Rush:

In accordance with section 14 of the Waste Management Act, 1992, shown below are estimates of the cumulative amounts of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction, and reuse and recycling. All numbers are in millions of tonnes.

	Waste Diversion Estimate	
	Reduction	Reuse & Recycling
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
Durham Region	2.6	3.9

Yours sincerely,

Ruth Grier

Ruth Grier
Minister

APPENDIX B

Public Consultation Materials for Stage 1

ONTARIO WASTE REDUCTION OFFICE

PUBLIC CONSULTATION ON WASTE DIVERSION ESTIMATES PROVIDED TO THE INTERIM WASTE AUTHORITY

TABLE OF CONTENTS

A. Introduction

This report describes a public information program conducted during the summer of 1992 on behalf of the Waste Reduction Office (WRO) of the Ontario Ministry of the Environment.

In compliance with Section 14 of the *Waste Management Act, 1992* (see Appendix B), estimates of the quantities of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction; and reuse and recycling, were given to the Interim Waste Authority (IWA) by the Minister of the Environment in May 1992 (see Appendix A). The intent of the public information program was to ensure that the public was aware of the estimates used by the IWA, and to encourage public discussion about waste diversion initiatives.

There also was information available about the role of the Waste Reduction Office in achieving the Province's waste diversion targets (*at least* 25% by the end of 1992 and *at least* 50% by the year 2000); and about measures the provincial government is undertaking to accelerate 3Rs activity around the province and particulary within the GTA (see Appendix B).

B. Outline of Program

The program was initiated when the IWA announced its Long List of Candidate Sites (EA Document II, Part two) on June 4, 1992. WRO displays and information materials were placed at each of the eight Community Information Centres (CIC) operated by the IWA throughout the Regions. WRO staff and/or consultants visited the CICs regularly throughout the review period, answering questions and ensuring sufficient information-materials were available with respect to the diversion estimates.

C. Materials Available at the Community Information Centres

The following materials were available at the Community Information Centres. These documents are included in Appendix B.

i. Waste Diversion Estimates for the Greater Toronto Area (GTA)
ii. The Role of the Waste Reduction Office in the Greater Toronto Area
iii. Ontario's Waste Reduction Targets
iv. The Ban on New Garbage Incinerators in Ontario
v. Why Three Landfill Sites in the Greater Toronto Area
vi. Why Not Ship Metropolitan Toronto's Garbage Some Place Else?
vii. *Waste Management Act, 1992* (Bill 143)
viii. Waste Reduction Office Initiatives Paper #4 - Measuring Progress Towards Ontario's Waste Reduction Targets
ix. The Road to a Conserver Society (June 17, 1991)
x. The Waste Crisis in the Greater Toronto Area - A Provincial Strategy for Action

Each Community Information Centre displayed comment sheets soliciting public input regarding the diversion estimates. Two comments were received. One inquired about what was being done with scrap tires and advocated consideration of tire derived fuel as proposed by a cement company. The other expressed concern that new landfills should not be considered when advancing technology has made incineration a more acceptable alternative.

D. Information Sessions

Information Sessions to discuss waste diversion and the estimates were held in Sutton, Stouffville and Snelgrove. These sessions were attended by members of the public who were contacted by telephone after having expressed an interest on sign-up sheets posted at each of the IWA's Community Information Centres.

Twenty-four (24) people participated in the Information Sessions. Many more had signed up and then decided, once they were given more information over the telephone, that the sessions were not of interest to them. Although sign up sheets were posted at all the Centres, there was no interest expressed in having information sessions at the other four CICs.

Another Information Session was scheduled for King City but turned into an informal discussion when only one participant showed up.

E. Summary of Participant's Comments

The following summarizes participant comments and questions from the Information Sessions.

1. General frustration with the siting process

Many participants arrived at these sessions with a high degree of suspicion regarding the siting process being undertaken by the Interim Waste Authority. This sentiment coloured their general approach to provincial government initiatives in the waste management area, including the 3Rs.

2. Landfilling is not seen as the solution

Most participants felt strongly that a more aggressive diversion solution should be developed, one that would make landfilling unnecessary. Also, several participants objected to the governments decision not to have the IWA include incineration and long-haul transport options in its Environmental Assessments. In York Region, participants strongly expressed their opposition to the size of the proposed site. They argued that the size of the site was too big for the needs of the Region, and that it should not be sized to accept Metro Toronto's garbage.

3. 3Rs activities and diversion efforts need more public resources

Concerns were raised at each of the meetings about the financial commitment to siting landfills. This commitment was perceived as much greater than the financial commitment to the 3Rs.

It was suggested that government's should provide industry with incentives to develop 3Rs; particularly in developing markets for secondary materials.

4. Concerns with the overall authority for waste management

Some participants felt the *Waste Management Act, 1992* gave too much authority to the Regional Municipalities, while others felt it gave the provincial government permission to be autocratic.

Some were uneasy that any diversion initiatives put in place by the present government could be overturned by its successors. These participants feared this would cause difficulties for industries that had 're-tooled'. They also felt that the communities hosting landfills would then be forced to accept materials for which the site had not been designed. There was also a concern that this would mean increased truck traffic.

Some participants felt the provincial government should force communities (and individuals) to recycle and reduce, through user pay systems, mandatory source separation, and stiffer penalties.

F. Regional Consultation Networks (RCNs)

In addition to the Information Sessions, WRO staff also made presentations on the diversion estimates and diversion initiatives to the Regional Consultation Networks (multi-stakeholder committees which have been meeting monthly throughout the IWA process).

Some participants at the RCN meetings strongly expressed their frustration that not enough was being done to seriously address the large quantities of waste being generated. They also expressed that more needed to be done to enhance diversion. Some also reiterated concerns about the exclusion of incineration and long-haul transport of waste as possible solutions.

G. Conclusions

This program attempted to satisfy both the need to disseminate information relating to the estimates given by the Minister of the Environment to the IWA; and to encourage public discussion about the estimates and about diversion initiatives within the communities affected by the IWA landfill site search.

1. Public interest and participation in the program was very modest.

2. Participants were more interested in discussing the IWA's search process than in discussing the estimates or the estimating procedure.

3. Interest was primarily focused on the large waste volumes currently going to landfill; and on ways to reduce local disposal of these volumes.

4. Participants made clear their concern that diversion activities should not be overshadowed by the siting of landfills.

5. Many expressed the opinion that governments - both local and provincial - should be placing a much higher priority on alternatives to local landfills.

Developing public interest in the details of diversion - such as what should be diverted first and why, developing markets - is an on-going process of information sharing and dialogue. This program was only a first step to initiate that dialogue, and subsequent efforts will engage stakeholders in a more detailed review of diversion alternatives for the GTA.

APPENDIX A

Minister's Letter to the Interim Waste Authority, May 15, 1992

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May 15, 1992

Ms. Jan Rush, Chair
Interim Waste Authority,
20 Bay Street, Suite 1625,
Toronto, Ontario.
M5J 2N8

Dear Ms. Rush:

In accordance with section 14 of the Waste Management Act, 1992, shown below are estimates of the cumulative amounts of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction, and reuse and recycling. All numbers are in millions of tonnes.

Waste Diversion Estimate

	Reduction	Reuse & Recycling
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
Durham Region	2.6	3.9

Yours sincerely,

Ruth Grier

Ruth Grier
Minister

APPENDIX B

Materials Available at CICs

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JUNE 1992

QUICK FACTS

WASTE DIVERSION ESTIMATES FOR THE GREATER TORONTO AREA (GTA)

Section 14 of the *Waste Management Act, 1992,* requires that the Ministry of the Environment provide the Interim Waste Authority (IWA) with written estimates of the amount of waste generated in the GTA expected to be diverted from disposal over a twenty-year period (1996 to 2015).

In May 1992, the Minister of the Environment provided these estimates to the IWA. The estimates are to be used by the IWA in planning for landfill capacity in the three GTA primary service areas of (1) Durham Region, (2) Peel Region and (3) Metropolitan Toronto and York Region.

The estimates were derived by the Ministry's Waste Reduction Office (WRO), based on the assumptions that population in the GTA will grow as forecast by regional municipal planners, and that the Province's waste diversion targets of at least 25 per cent by 1992 and at least 50 per cent by 2000 will be achieved. It was also assumed that the per capita amount of diversion will level off after the year 2000.

Waste tonnages that otherwise would be generated if diversion were not increased relative to 1987 were calculated based on the actual tonnes per capita disposed of in 1987. The year 1987 is used as a planning base by the Ministry and by several municipalities.

The WRO's estimates are divided into the amount of waste that may be diverted through reduction, and the remainder that would then be diverted through reuse and recycling. The method for deriving the estimates is explained in the Ministry's technical report entitled **Waste Diversion Estimating Method for the Greater Toronto Area**. The cumulative estimates for the twenty-year period are provided below in millions of tonnes.

	Reduction	Reuse and Recycle
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
Durham Region	2.6	3.9

Later this year, the WRO will initiate a public consultation process to assist in developing a waste diversion strategy designed to achieve at least the estimated levels of reduction, reuse and recycling in the GTA. The means for achieving waste diversion on this scale will be the primary focus of this consultation.

For more information on waste issues contact:

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JUNE 1992

QUICK FACTS

THE ROLE OF THE WASTE REDUCTION OFFICE IN THE GREATER TORONTO AREA

The mandate of the Waste Reduction Office (WRO) is to help move Ontario from a society which consumes and disposes, to one that conserves resources through the reduction, re-use, and recycling of valuable materials which have traditionally been considered "waste". To achieve this, the WRO is working cooperatively with stakeholders across the province to strengthen policies and programs that maximize diversion from disposal of those "secondary" - but still valuable - materials.

Charged with coordinating the implementation of the Waste Reduction Action Plan (WRAP) announced in February of 1991, WRO efforts are focussed on encouraging source reduction, exploring new opportunities for re-use, and stimulating markets for recyclables.

As part of its responsibilities to maximize diversion from disposal, the WRO is coordinating the development and implementation of a 3Rs (reduction, re-use, and recycling) strategy for the Greater Toronto Area, that will achieve the provincially set targets of at least a 25 per cent reduction of waste requiring disposal by 1992 and at least a 50 per cent reduction by the year 2000.

At this time the landfill planning process for the GTA, being undertaken by the Interim Waste Authority (IWA), requires estimates of what level of diversion will be achieved throughout the life of the sites (1996 to 2015). Under the Waste Management Act of 1992, the Ministry of the Environment is resposible for providing these estimates. Information on the calculation methods used by the WRO to arrive at the estimates can be found on the information sheet **Waste Diversion Estimates for the Greater Toronto Area (GTA).**

Later this year the WRO will also be providing to the IWA information on the effects 3Rs activity, such as composting in the GTA, may have on the composition of the waste requiring disposal.

During the fall of 1992, the WRO will be initiating a public consultation process to assist in further developing the diversion strategy for the GTA that will - at a minimum - meet the provincial waste reduction targets.

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JUNE 1992

QUICK FACTS

ONTARIO'S WASTE REDUCTION TARGETS

The Ontario Minister of the Environment has established two targets for waste to be diverted from disposal: A reduction of at least 25 per cent by 1992, and a reduction of at least 50 per cent by the year 2000 from 1987 rates. These targets apply to non-hazardous solid waste requiring disposal either at sanitary landfills or existing incinerators.

To achieve these targets, the province has initiated a series of diversion initiatives to reduce Ontario's dependence on disposal facilities. Data from operators of municipal and private waste management facilities will be collected, as will information about successful diversion initiatives, to assist in the development of waste management system plans. The information will also help to determine the level of investment required for programs to enhance diversion, such as market development, waste exchanges, and other initiatives.

Progress in reaching the targets will be measured by comparing amounts of waste requiring disposal in each year, with the amount disposed of in 1987. Population changes after 1987 will be taken into account to arrive at a **Per Capita Diversion Rate.** In addition to identifying province-wide success in reaching the target, municipalities and waste management system planners will find this data useful in evaluating local progress at waste diversion.

For further information on the provincial waste diversion targets, please refer to WRO Initiatives Paper No.4: **Measuring Progress on Ontario's Waste Reduction Targets.**

For more information on waste issues contact:

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EN BREF...

LES OBJECTIFS DE L'ONTARIO EN MATIÈRE DE RÉDUCTION DES DÉCHETS

Le ministère de l'Environnement de l'Ontario a établi deux objectifs en matière de réduction des déchets, soit la réduction d'au moins 25 p. 100 des déchets normalement destinés à l'enfouissement, en 1992, et d'au moins 50 p. 100, d'ici l'an 2000. Ces objectifs s'appliquent aux déchets solides non dangereux destinés à être éliminés dans les lieux d'enfouissement ou dans les incinérateurs existants.

Pour atteindre ces deux objectifs, la province a instauré une série d'initiatives de réacheminement des déchets afin de réduire la dépendance de l'Ontario à l'endroit des installations d'élimination des déchets. Des données provenant des exploitants d'installations municipales et privées de gestion des déchets ainsi que des informations sur les initiatives de réacheminement des déchets couronnées de succès seront compilées pour faciliter l'élaboration de systèmes de gestion des déchets. Ces données serviront également à déterminer le montant des investissements nécessaires pour la création de programmes destinés à mettre en valeur le réacheminement des déchets, tels que l'exploitation des marchés, l'échange des déchets et autres initiatives.

Les progrès réalisés seront mesurés chaque année en comparant les quantités de déchets à éliminer par rapport aux chiffres de 1987. Les variations démographiques seront prises en compte dans la détermination du « taux de réacheminement des déchets par habitant ». En plus de permettre de mesurer les progrès par rapport aux objectifs provinciaux, ces données serviront aux municipalités et aux planificateurs de systèmes de gestion des déchets à évaluer les progrès réalisés à l'échelle locale.

Prière de consulter le document de travail n° 4 du Bureau de gestion de la réduction des déchets, intitulé *Mesure des progrès de l'Ontario en matière de réduction des déchets*, pour en savoir plus long sur les objectifs provinciaux en matière de réacheminement des déchets.

Pour obtenir de plus amples renseignements sur la gestion des déchets, s'adresser à :

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Environment
Environnement
Ontario

QUICK FACTS

Fall 1992

THE BAN ON NEW GARBAGE INCINERATORS IN ONTARIO

INCINERATOR BAN:

In April 1991, the Minister of the Environment, Ruth Grier, banned the construction of new garbage incinerators in Ontario. In September 1992, the ban was given legal force by an amendment to Regulation 347 (formerly Regulation 309) under the *Environmental Protection Act*.

The ban does not affect Ontario's five existing garbage incinerators. Every year about 400,000 tonnes of Ontario's garbage are burned in large incinerators. That's nearly 4 per cent of all solid waste from residential, commercial, industrial and institutional sources combined. However, the Certificates of Approval and monitoring requirements for these facilities are being reviewed by the environment ministry to determine where they need to be upgraded. In additon to outlawing new incinerators, the Regulation defines permissible uses of incinerators for waste streams which may be hazardous or have no viable recycling potential. These include several types of sludges, animal and pathological wastes, forestry plant wastes and wood waste. As well, apartment incinerators were phased out in 1989.

The ban on garbage incineration is based on a careful consideration of the overall environmental and economic impact of the technology. It is in keeping with the Ontario government's emphasis on pollution prevention and waste reduction as the primary means of protecting the environment.

HEALTH AND ENVIRONMENTAL IMPACT:

Even with the best emission controls, all incinerators cause air pollution. The pollutants vary according to the type of garbage burned. They can include nitrogen oxide, sulphur dioxide, hydrogen chloride, metals and organic pollutants such as dioxins and furans. Some of these pollutants contribute to global warming. Many of them are toxic. Eventually they settle in soil and water, adding to the cumulative toxic load on the environment, which can then have a detrimental impact on human health.

Moreover, incineration does not make the garbage disappear. Incineration simply reduces the amount of waste by about two-thirds. The residual bottom ash still requires disposal in landfill sites. As well, fly ash captured in the smoke stack is extremely toxic and has to be disposed of as hazardous waste at a high cost in specially designed landfill sites.

COST AND INEFFICIENCY:

Garbage incinerators are extremely expensive to build. For example, an incinerator to burn only a quarter of the solid waste from the Greater Toronto Area would cost almost a billion dollars. Operating costs for incinerators are also very high. These costs typically exceed the potential savings from the recovery of energy for heating or electrical power.

There is no cost advantage of garbage incinerators over aggressive 3Rs (reduction, reuse and recycling) programs such as composting, and over the siting, construction and maintenance of landfills. As a result of major financial losses, the world's largest garbage incinerator, located in Detroit, Michigan, has been sold. An incinerator in London, Ontario, is now for sale.

COMPETITION WITH WASTE REDUCTION:

The environment ministry's waste management strategy encourages Ontario's citizens to adopt the princi-

programs based on the 3Rs, it is promoting far-reaching waste reduction in Ontario's residential, industrial, commercial and institutional sectors. With these programs, the Government of Ontario expects to meet its waste reduction targets of at least 25 per cent in 1992 and at least 50 per cent by the year 2000.

Rather than helping waste reduction efforts, however, incinerators require a constant large supply of garbage - up to 3,000 tonnes per day to be economically viable - even if it means shipping it in from other places. Some of the "waste" burned includes materials that could have been recycled or re-used. This hurts the economic viability of recycling programs such as the Blue Box, and it removes incentives for manufacturers to make products and packaging that are reusable and recyclable.

ECONOMIC RENEWAL:

Given Ontario's current economic situation, building new garbage incinerators will impose unacceptable environmental, social and financial costs on Ontario taxpayers. Also, burning valuable resources causes job losses. Incineration competes with the development of new environmentally responsible technologies and materials that would help Ontario industry in an increasingly competitive global economy. Other countries have already recognized "green industries" as key components of their plans for economic recovery. Ontario is taking similar actions that will lead to a healthier and more environmentally sustainable economy.

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QUICK FACTS

Fall 1992

WHY THREE LANDFILL SITES IN THE GREATER TORONTO AREA?

The Greater Toronto Area (GTA) is running out of landfill space. To ensure that the long-term waste disposal needs of the GTA can be managed, in April 1991, the provincial government established the Interim Waste Authority to select and develop three new landfill sites. These sites will be designed to last at least 20 years.

One site will be located in the Region of Peel; one site in the Region of Durham. Each of these two sites will accept garbage only from the region in which it is located. A single site, however, will serve the combined disposal needs of Metropolitan Toronto and the Region of York. In other words, four out of the five regions within the GTA will be serviced by the three landfill sites. The IWA is not undertaking a site search in Halton Region, because it already has an approved landfill.

Some people have suggested that the entire GTA be serviced by a single "super" landfill site. Others have suggested a greater number of "mini" landfill sites for each region. In determining that the IWA's mandate would be limited to three separate site searches, a sequence of decision-steps was followed.

DISPOSAL SERVICE AREAS:

The geographic area requiring waste disposal services, in general terms, is known as a "waste disposal service area." Is it better to think of the GTA as one large disposal service area, or as a number of smaller areas? In the case of the GTA, the disposal service areas correspond to the areas of the five regional or "upper tier" municipalities. The operation of waste disposal facilities (as different from the collection of waste) is an upper-tier jurisdiction. The "lower tier" or local municipalities do not have responsibility for waste disposal. At most, their responsibility is limited to the collection of waste from homes and businesses.

In effect, the GTA is divided into five waste disposal service areas. However, for the purposes of the IWA landfill site search, the number of disposal service areas under consideration was reduced to four by excluding Halton Region for the reason noted above.

Next, the disposal service areas of Metro Toronto and York Region were combined, thereby reducing the number of disposal service areas to three. The decision to combine the two areas was based on an arrangement between Metro Toronto and York Region. In the arrangement, currently in effect, Metro Toronto agrees to service its own disposal needs as well as those of York Region.

LOCAL RESPONSIBILITY:

As announced by the Minister of the Environment, Ruth Grier, in April 1991, the principle of local responsibility for solid waste was applied in the GTA to mean that the landfill site selection process would be confined to the GTA. No municipal waste from the GTA would be sent to places elsewhere in Ontario. As well, a disposal service area would not handle waste generated from another (except in the case of the combined Metro Toronto/York disposal service area). Thus, the principle of local responsibility effectively eliminated the idea of a "super" landfill site for the entire GTA. These principles were included in legislation introduced to the Ontario Legislature as *The Waste Management Act* (Bill 143) in October 1991. *The Waste Management Act*, 1992 came into effect on April 27, 1992.

There were other arguments against a "super" site. For one thing, a GTA "super" site would need to handle more than 56 million tonnes of garbage over at least 20 years. Finding an environmentally acceptable landfill site of that size would be extremely difficult. Its environmental and social impact on a local community would be significant.

EFFICIENCY:

The alternative of developing only one landfill in each of the three disposal service areas, instead of developing a series of smaller sites in each of the disposal service areas, was decided upon primarily on the basis of efficiency in terms of cost and environmental approvals.

Developing and operating a landfill site is very expensive. Generally, a single landfill site servicing the disposal needs of a number of communities is much more cost-efficient than a series of mini-sites. It reduces the duplication of facilities, staff and operations, as well as the complicated and costly environmental monitoring required at each site. In fact, a group of municipalities sharing a landfill site is common practice, especially if the municipalities are federated into a larger regional municipality as in the GTA.

All landfill sites require approval under provincial environmental assessment legislation. This process, being followed by the IWA, involves documenting very precisely the potential impact of a landfill on the agricultural, ecological, hydrogeological, geological and social features of the area. Doing an environmental assessment for a number of mini-sites for each disposal service area would result in duplication, substantially higher costs, and a significantly longer period of time to obtain approval.

For more information on waste issues contact:
Environment Ontario
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135 St. Clair Avenue West
Toronto, Ontario M4V 1P5
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1-800-565-4923

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QUICK FACTS

Fall 1992

WHY NOT SHIP METROPOLITAN TORONTO'S GARBAGE SOME PLACE ELSE?

Finding a place for Metropolitan Toronto's garbage is an important environmental concern. The two landfill sites owned by Metro Toronto - Keele Valley Landfill in York Region, just north of Toronto, and the Brock West Landfill in Durham Region, just east of Toronto - will reach capacity in the next few years.

One suggestion for handling Metro's garbage problem is to ship the waste over long distances to places elsewhere in Ontario. However, most communities beyond the Greater Toronto Area (GTA) oppose the idea. (The GTA includes the Regions of Peel, York, Durham, and Halton, and Metropolitan Toronto). A process for selecting three landfill sites to handle the wastes of the GTA (with the exception of Halton Region, which already has an approved new landfill) is now underway. This site selection process is confined to considering sites only within four out of the five GTA regions which are to be serviced by the new long-term landfill sites.

LOCAL RESPONSIBILITY:

The difficulty with shipping Metro's waste to other places in the province is that it does not solve the garbage problem. It only moves it out of sight. Waste disposal practices which encourage an "out-of-sight, out-of-mind" attitude do not help Ontario's efforts to reduce the amount of waste through the 3Rs - reduction, reuse and recycling. The principle of local responsiblity means that municipal governments, which have the responsibility for waste disposal, must do so within or as close as possible to their own areas of jurisdiction.

The only exception to this general rule which is acceptable is when a municipality must ship its waste to another municipality for a short time as 3Rs programs are being put into place and new landfill sites are getting environmental approvals or being constructed. In this case, transporting waste from one municipality to another is a short-term solution to an emergency.

Until the spring of 1991, municipal councils in the GTA had been seriously entertaining the idea of transporting their garbage to rural southern Ontario and northern Ontario. In April 1991, the Minister of the Environment, Ruth Grier, established the Interim Waste Authority with the mandate of finding three new, long-term landfill sites in the GTA. She stated that in keeping with the principle of local responsibility for waste, the authority will not consider transporting GTA waste outside the GTA. These principles were included in legislation introduced to the Ontario Legislature as *The Waste Management Act* (Bill 143) in October 1991. *The Waste Management Act*, 1992 came into effect on April 27, 1992.

SOCIAL AND ENVIRONMENTAL BENEFITS:

Taking the long view, the proposal has several social and environmental advantages over shipping garbage outside of the GTA:

- It encourages local residents, industries, and other groups to participate in the process of choosing the locations for the landfill sites.

- It sustains public awareness of the great need to reduce the volume of waste generated every day in the GTA.

- It keeps the money earned from the fees charged to industrial users of the landfill sites within the GTA, making it available for investment in local 3Rs programs such as Blue Box recycling and home composting.

- It eliminates the high financial and environmental costs of transporting waste long distances. Such costs may include the environmental effects of greatly increased traffic through small communities as well as the expense of upgrading highways, local roads and railway corridors, and building transfer stations.

- It means that the GTA communities have reliable and uninterrupted access to landfill sites. When shipping waste over a long distance to another jurisdiction, there may be the risk of unanticipated restrictions on access to the landfill site.

Some proposals for transporting garbage to municipalities outside of the GTA include the shipment of recyclables. But it does not make economic sense to pay the cost of shipping recyclable materials to another municipality so they can be sorted and shipped back to the GTA - the biggest market for recyclable materials in Ontario.

Finally, by managing their own waste, municipalities within the GTA will provide a model for other Ontario communities which are now or soon will be facing similar waste problems.

For more information on waste issues contact:

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Waste Reduction Office
Initiatives Paper No. 4

MEASURING PROGRESS TOWARDS ONTARIO'S WASTE REDUCTION TARGETS

REDUCE
REUSE
RECYCLE

Ontario

Environment
Environnement

Waste Reduction Office Initiatives Paper Series

PIBS 1708E	Initiatives Paper No. 1: Regulatory Measures to Achieve Ontario's Waste Reduction Targets, October 1991
PIBS 1882E	Initiatives Paper No. 2: Waste Management Planning in Ontario, March 1992
PIBS 1882E-02	Municipal Waste Management Powers: A Discussion Paper, March 1992, Ministry of Municipal Affairs in conjunction with the Ministry of the Environment
PIBS 1954E	Initiatives Paper No. 4: Measuring Progress Towards Ontario's Waste Reduction Targets, June 1992

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EXECUTIVE SUMMARY

This is the fourth in a series of Initiatives Papers discussing topics related to reducing and managing Ontario's wastes. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials.

Initiatives Paper No. 4 provides guidance for monitoring progress towards achieving the Province's waste reduction targets. It explains the targets, and discusses factors affecting their measurement such as types of materials, units of measure, and monitoring points in the waste management system. It also discusses application of the targets for planning purposes. These topics are all linked to the development of a waste management information system.

The Government of Ontario has established targets to decrease waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the base year of 1987. In February, 1991, the Minister of the Environment announced the *Waste Reduction Action Plan*, aimed at accelerating efforts across Ontario to reduce the amount of waste going to disposal. Implementation of the *Waste Reduction Action Plan* through the 3Rs (reduction, reuse, recycling) programs is being coordinated by the Waste Reduction Office, established in 1991 within the Ministry of the Environment. The 3Rs of waste management help to divert recoverable material from disposal to productive uses in the economy.

Ontario's waste reduction targets apply to non-hazardous solid wastes "traditionally" managed by disposal at landfill, dump, and existing incineration facilities. They are expressed relative to the tonnes disposed of in the base year 1987. Various factors, such as flucutations in population, economic growth, and international trade affect the accuracy with which the diversion quantities can be calculated. The Ministry is developing models that take these factors into account when reporting diversion figures.

The targets apply to planning and monitoring progress in the province as a whole. However, both the municipal and the industrial, commercial and institutional (IC&I) sectors expressed interest in planning and monitoring their individual contributions. To satisfy these needs, the Ministry developed two ways to measure progress towards achieving the waste reduction targets for any particular year.

The *Per Capita Diversion Rate* is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The Ministry uses this formula to monitor progress at the provincial level. The formula can also be used by municipalities to monitor their progress in achieving the same provincial targets applied at the municipal level.

The second method is the **Absolute Diversion Rate**, calculated as follows:

$$\frac{\text{1987 Waste Disposal - 19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

This formula is used to determine the effect of diversion on remaining landfill capacity. Individual IC&I organizations also can use it to determine the success of their internal diversion programs.

The movement of waste and recoverable materials through a waste management system can also be monitored. The waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured. Different stakeholders have their own monitoring requirements such as the need for identifying efficiency improvements through waste reduction or to help in the sizing of facilities. From the Province's perspective, the monitoring of waste and material streams will help in the implementation of waste diversion initiatives aimed at diminishing the use of disposal facilities. With that goal in mind, municipal and private waste managers will be required by regulations now under consideration to report quantities of waste received at disposal facilities. These reports will provide details about the successes of specific waste diversion initiatives and programs.

Diversion opportunities and priorities will also vary according to the different types of materials involved. The data reported by waste disposal facilities will need to identify the composition of the waste stream received for disposal, in order to indicate the effectiveness of efforts to divert particular classes of material. To ensure that each

disposal facility classifies materials in the same way, the Ministry led a task force of municipal and IC&I representatives in developing a list of "Standard Material Classes." The Province's classification system need not replace the categories now used by municipalities and private waste managers. Rather, it provides a simple way to translate their own information into a common format used across the province. Thus stakeholders can evaluate quantities of materials still available for diversion, and indicate the types of materials recovery facilities or other diversion initiatives still required.

The data reports are part of a waste management information system now being developed by the Ministry. It includes a database to record disposal data, successful diversion initiatives and relevant municipal and facility information. Municipalities will be required to submit periodic data reports to the Ministry. The Ministry is also developing models to estimate disposal for those facilities without weigh scales or estimating techniques.

The data will be used to calculate the provincial diversion rates, assist in creating waste management system plans, and allocate support for market development and waste exchanges.

The Ministry continues to support municipalities and private waste managers by providing technical outreach and funding support programs.

Ontarians, working together, can develop a conserver society, by becoming leaders in developing ways to minimize waste and maximize secondary resource usage.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

The paper addresses requests from municipal and industrial, commercial and institutional (IC&I) sectors for guidance on monitoring the attainment of the provincial waste diversion targets of at least 25 per cent in 1992 and at least 50 per cent by 2000. The paper provides information which can be applied as follows:

- As a means to evaluate progress in waste reduction against the provincial targets, both at the provincial and municipal levels;
- As a tool for use in planning and sizing waste management and material recovery facilities;
- As guidelines for the private sector to plan initiatives to reduce waste identified in waste audits; and
- As guidelines for the private sector to plan initiatives to reduce packaging wastes.

The Ministry encourages all those involved in waste management activities to use the methods outlined in this document to monitor and measure waste diversion. Adopting standard methods of measurement helps provide a consistent basis for assessing diversion achievements. The methods are an effective tool for the planning of waste management systems and can be used to identify the opportunities for material recovery programs.

1.2 Waste Reduction Office *Initiatives Papers* Series

This publication is the fourth in a series of *Initiatives Papers* describing the provincial government's waste reduction policies, activities and directions. It provides an interpretation of the provincial waste reduction targets, a list of standard material classes, confirms units of measure, explains the application of the targets, and gives an overview of a waste management information system. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials. Previous publications in the *Initiatives Papers* series include:

Initiatives Paper No. 1: *Regulatory Measures to Achieve Ontario's Waste Reduction Targets*, October 1991

Initiatives Paper No. 2: *Waste Management Planning In Ontario* March 1992.

Municipal Waste Management Powers: A Discussion Paper, issued by the Ministry of Municipal Affairs in conjunction with the Ministry of the Environment, March 1992.

1.3 Ontario's Waste Reduction Targets

The Government of Ontario has established targets to decrease the amount of waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the amount of waste disposal for the base year of 1987. The targets are intended to encourage Ontario's move towards a "conserver society" and to manage the province's secondary resources through application of the 3Rs -- reduction, reuse and recycling. Achieving the targets will indicate progress towards these objectives.

Initiatives Paper No. 1 describes the first set of proposed regulatory measures which were part of the *Waste Reduction Action Plan* announced by the Minister of the Environment in February 1991. The measures provide a regulatory foundation for a consistent approach to achieving the province's waste reduction targets. These regulatory measures, expected to be announced by the end of 1992, will address the following issues:

- Preparation of waste audits and implementation of waste reduction workplans by IC&I organizations;
- Establishment and operation of source separation programs by IC&I organizations and municipalities; and
- Simplification of the approvals process for 3Rs facilities.

Monitoring progress relative to the targets will help evaluate the impact of these regulations and identify the need for other 3Rs initiatives.

Initiatives Paper No. 2 describes changes to the current waste management planning program that would introduce an integrated "two stream" planning and approvals process for waste management systems. One planning stream is aimed at establishing a "Waste Diversion System" which can begin implementation even as the second planning and approvals stream is underway for the "Waste Disposal System." The Province's waste reduction targets, if adopted as planning objectives, have significant implications for the sizing and the design of the overall waste management system. Initiatives Paper No. 2 was released for public consultation together with a discussion paper on municipal waste management powers.

1.4 Trends in Disposal and Diversion

Figure 1, "Illustrative Trends in Disposal and Diversion", indicates the significant quantity of materials which must be diverted from disposal if the targets are to be met. The diagram is a simplification of reality, based on gross estimates and projections, developed as an aid to illustrating relationships between some key concepts.

The dashed line represents the amount of waste going to disposal in per capita rates (tonnes/person/year) as a percentage of the 1987 base year. Various waste composition analyses indicate that annual per capita disposal rate continued to increase until 1987. Subsequently, disposal rates have decreased partly as a result of municipal 3Rs programs.

Above the dashed line is a shaded area labelled "Existing Diversion". It represents the unknown per capita rate of used materials which have been absorbed back into the economy through "traditional" 3Rs activities existing long before 1987 and expected to continue into the future. Examples of such activities include scrap metal salvaging, refillable soft drink containers, and second-hand stores.

Without any new diversion activities, however, the dashed line is likely to continue in an upward trend. The solid line, which begins to emerge after 1987, depicts the *maximum* desirable per capita rates of disposal. The area labelled "New Diversion" represents additional 3Rs activities needed to achieve the provincial waste reduction targets. It also represents the future potential of a secondary materials industry as a growing economic sector. The Ministry's funding and support programs are designed to maintain the existing diversion activities while maximizing development of the new diversion activities.

2.0 INTERPRETING THE PROVINCIAL WASTE REDUCTION TARGETS

Ontario's targets state that the amount of solid waste going to disposal must be reduced by at least 25 per cent in 1992 and by at least 50 per cent by the year 2000. The Ministry calculates attainment of the targets at a provincial level and monitors waste diverted from disposal against the 1987 base year.

The targets apply to municipal solid waste, which includes all solid non-hazardous materials from all sources in Ontario from both the residential and IC&I sectors. Disposal includes materials sent to landfills, dumps and incinerators, including those located outside Ontario.

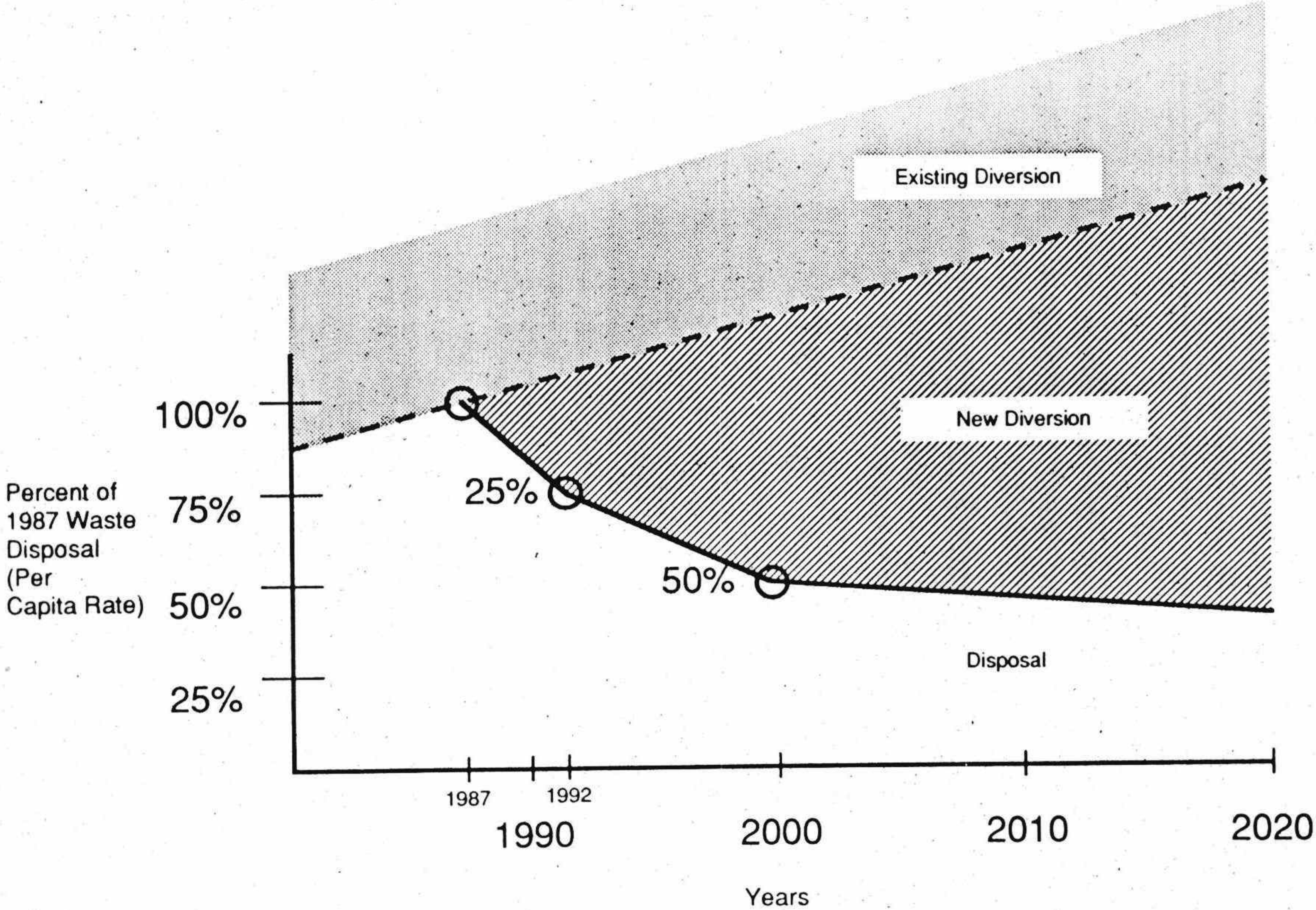


Figure 1: Illustrative Trends in Diversion and Disposal

3.0 FACTORS AFFECTING MEASUREMENT OF WASTE DIVERSION

The amount of materials diverted from disposal is difficult to measure, and is subject to many complex variables such as shifts in population, employment, industrialization, economic growth, and international markets. To measure diversion from disposal, one has to measure the changes in the amount of waste going to disposal. Complex demographic and socioeconomic factors cause variations in the disposal of residential waste, while changes in production levels, automation, employee numbers, sales revenues, product design, and markets directly affect the types and quantities of waste generated by IC&I organizations.

As the Ministry develops forecasting models, these variables will be taken into account when reporting diversion figures and developing realistic projections for diversion.

4.0 TWO WAYS OF MEASURING PROGRESS TOWARDS THE WASTE REDUCTION TARGETS

Two ways to measure progress against the targets have been developed. Both formulae are indicators of social change from a "consumer" to a "conserver" society. The *Per Capita Diversion Rate* reflects changes in disposal which take into account the changing population base of the province. The *Absolute Diversion Rate,* based on actual tonnages, provides a way to forecast landfill requirements. An increase in the per capita diversion rate will not necessarily lead to an absolute decrease in the number of tonnes of waste going to disposal if the population rises significantly.

For purposes of monitoring achievement of the province's waste reduction targets, the *Per Capita Diversion Rate* will be used by the Ministry of the Environment.

4.1 Per Capita Diversion Rate

Waste discarded by the residents and enterprises of Ontario varies in quantity with the size of the population living and working in the province. This formula reflects changes in the population base when monitoring diversion. It is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the per capita percentage of diversion achieved in any year relative to the level of waste disposal in 1987.

4.2 Absolute Diversion Rate

Landfills do not expand in relation to population or industrial growth. Consequently, using a formula based on population change is inappropriate for landfill planning. Therefore, the absolute diversion rate formula, as shown below, will be used to monitor landfill requirements:

$$\frac{\text{1987 Waste Disposal} - \text{19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the rate of diversion in a target year based on the amount of waste generated in 1987 as the reference base.

5.0 UNITS OF MEASURE

The Ministry monitors diversion and disposal by weight. The metric tonne provides a common unit of measure across material types and waste processing methods (e.g. compaction equipment for truck loads and landfills). Tracking weight rather than volume is also appropriate when considering marketing requirements and diversion programs (such as procurement policies and product design). Sales of secondary materials are typically based on weight rather than volume.

While landfill reach capacity by volume rather than weight, it is easier to measure waste going into a landfill by weight. Automated weigh scales record the weight of a truck as it enters and leaves the facility, providing a simple recording mechanism. Tracking volumes is more labour intensive and prone to error. Conversion of tonnes of landfilled material to volumetric measures can be calculated and landfill capacity levels measured.

6.0 APPLICATION OF THE WASTE DIVERSION FORMULAE

The waste reduction targets were established to encourage the diversion of waste from disposal to productive uses for the province as a whole. Since the original announcement of the targets, some municipalities and IC&I organizations have indicated a desire to apply the targets to their waste reduction efforts. The following sections indicate how individual municipalities and IC&I organizations might apply the formulae.

6.1 Monitoring Diversion for the Province

On a province-wide basis, the Ministry will calculate attainment of the targets using the *Per Capita Diversion Rate*. The Ministry is not measuring the attainment of the targets by individual municipalities or IC&I organizations.

6.2 Municipalities Monitoring Diversion

For purposes of consistency, individual municipalities or groups of municipalities (such as a waste management system planning area) may use the *Per Capita Diversion Rate* formula to assess their own performance. This will assist municipal waste management planners to compare local diversion achievements in their planning area to the province as a whole or to other planning areas. On the other hand, waste reduction targets based on an *Absolute Diversion Rate* will assist in the sizing of waste management facilities. Either approach is acceptable as a waste management system planning objective.

6.3 IC&I Organizations Monitoring Diversion

The Ministry recognizes that factors such as changing market share, product mix or automation may make year-by-year comparisons difficult for some IC&I organizations. Similarly, changes in municipal population figures do not proportionately change the amount of waste produced by a business. Therefore, the Ministry is working with IC&I representatives on a task force to determine the appropriate adjustment factors.

In the meantime, an IC&I organization interested in assessing its own performance can apply the *Absolute Diversion Rate* formula.

7.0 WASTE MANAGEMENT SYSTEM MONITORING

A waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured.

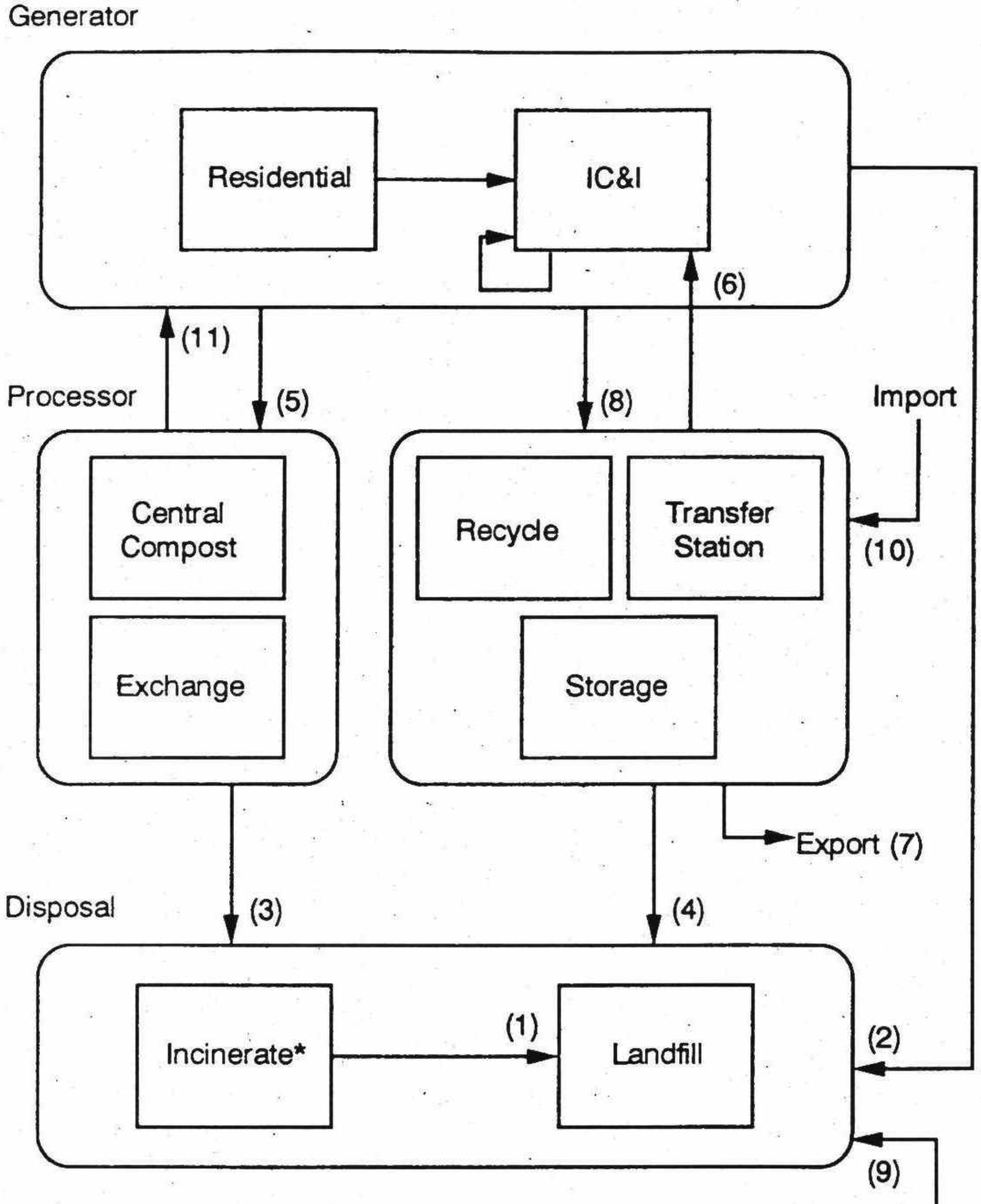
To provide effective support to municipal and IC&I efforts to divert waste from landfill and to achieve the province's waste reduction targets, the Ministry monitors the various streams of waste and recoverable materials. Figure 2, "Waste Management System Monitoring Model", depicts the flow of materials through the waste stream, and identifies key points at which data can be collected. The arrows indicate the flow of wastes and secondary materials; the arrowheads indicate the points at which the flows can be monitored. The boxes indicate the generators, processors and disposers of waste.

Generators: The boxes in the top section of Figure 2 show the sectors that discard materials into the waste stream. Waste generators, including households and IC&I organizations, discard materials that are sent directly to waste disposal facilities (2) or to processing facilities (5, 8). Some material is diverted from the waste stream through on-site composting or through 3Rs initiatives managed by the generators. To implement the province's *Waste Reduction Action Plan*, the Ministry, through its Waste Reduction Office, is developing support programs to help organizations take an audit of their waste and to take steps to reduce it.

Processors: The boxes in the middle section of Figure 2 show the types of facilities that process the waste stream to recover secondary materials. Waste processors receive materials collected by municipalities through the Blue Box or other municipal 3Rs programs, from waste management companies, or directly from individual generators (5, 8, 10). After processing, materials are sold to individual generators (6, 11), or sent for final disposal (3, 4, 7). Waste processors are grouped as follows:

- Central compost facilities process leaf, yard and food wastes collected from residences and IC&I organizations. The resultant material is available to households or IC&I organizations.

- Exchange facilities, such as salvage operations and waste exchanges, provide a mechanism for households and IC&I organizations to trade materials for which no ready market exists. Exchanges may receive materials for subsequent distribution or may act as a broker connecting



1 - 4 Monitored now
5 - 7 Monitored 1992
8 Monitored 1992/93
9 - 11 Monitored 1993

* Existing Facilities only

Figure 2: Waste Management System Monitoring Model

suppliers with customers.

- Recycling facilities process source-separated materials for sale and distribution to markets.

- Storage facilities receive and store source-separated materials that exceed current market demand.

- Transfer stations receive small loads of materials, sort them, and ship large loads to final destination points (disposal facilities or recyclers).

Disposal: The boxes in the bottom section of Figure 2 show the facilities dealing with final disposal of residual waste, e.g. incinerators and landfills. New facilities for the incineration of municipal solid waste have been banned in Ontario, although existing incinerators may continue to operate under stricter environmental control requirements. Incinerator operators are required by the Ministry to measure quantities of materials received as well as residual ash sent for subsequent disposal. Landfills are the ultimate end of the waste stream flow. All residuals from 3Rs activities, business operations, waste processing and incineration are deposited in landfills.

At present, the Ministry monitors materials received at municipally-operated waste disposal facilities (points 1, 2, 3, 4). To get a complete picture of disposal, regulations are being considered to require reporting from disposal and diversion facilities operated by private waste managers (1, 2, 3, 4).

In the future, waste and secondary materials handled by material recovery and central compost facilities also will be tracked (5, 8), as will materials shipped from material recovery facilities to secondary markets (6, 11), exports (7) and imports (9, 10). As more IC&I organizations undertake waste audits, they will build up a comprehensive database that can be shared with organizations specializing in materials exchanges. Participation in such exchanges can lead to significant savings in disposal and other waste management costs.

8.0 TOWARDS A WASTE MANAGEMENT INFORMATION SYSTEM

Progress towards a conserver society can be measured by monitoring materials diverted from disposal. The Ministry of Environment's proposed Waste Management Information System will be a mechanism that allows such monitoring to be performed effectively. In addition to monitoring progress towards diversion targets, the data will be used to assist municipalities and IC&I organizations:

- To identify feasible waste diversion options;
- To identify secondary market opportunities;
- To assist in developing waste management systems plans;
- To support waste exchanges; and
- To develop and evaluate technical and funding support programs.

The system has several components, including: Standard Material Classes, a data collection process, a database to store the disposal and diversion figures, a computer system to process the data (the Waste Diversion Information System), models to estimate and forecast disposal, and a means to communicate progress.

8.1 Standard Material Classes

A task force consisting of representatives from municipalities, the private sector and Environment Canada compiled a list of Standard Material Classes (see *Appendix I*). The Standard Material Classes apply to materials which enter or leave the waste stream, from the point of discard, through source separation, collection and processing, to final marketing of the secondary material and/or disposal. By using Standard Material Classes when reviewing data on disposed or diverted materials, stakeholders will be able to identify material recovery facility and market requirements. The classes were developed to monitor materials sent to disposal and diverted from disposal rather than to specify product requirements. Future enhancements could include categories to address market requirements.

Under the proposed waste reduction regulations, the Standard Material Classes will provide the basis on which waste diversion initiatives can be monitored. The classification system is not intended to replace the material classes currently used by municipalities or IC&I organizations as they may be needed to track materials at a finer level of detail (e.g., light bulbs and window glass).

8.2 Data collection

The waste management system monitoring model specifies the points in the flow of waste and recoverable materials through the system where data can most readily be collected. Regulations to require reporting to the Ministry on the quantities of materials received by waste disposal and diversion facilities are being considered. The regulations would require that both municipal and private owners of waste processing and disposal facilities report the tonnes by

material type (Standard Material Classes) processed by each facility in the reporting period. The reports would also need to indicate the source sector (i.e., residential or IC&I) of the materials.

Reporting period frequencies will vary depending on the size of the municipality and availability of weigh scales.

Facilities with weigh scales: monthly reports where facilities serve municipalities whose population exceeds 100,000; quarterly reports from other facilities.

Facilities without weigh scales: quarterly reports from those facilities which can estimate tonnages. The Ministry will work with municipalities to develop estimates of waste disposed.

The Ministry will calculate estimates of disposal and diversion for the remaining areas (such as unincorporated areas) using the provincial per capita waste disposal rate.

8.3 Database

The Ministry will maintain a database of materials diverted and disposed of by facility, the standard material classes, waste management methods (various 3Rs initiatives and programs for diverting materials from waste disposal), and relevant municipal and facility data. The database also will contain successes published by either municipal or IC&I organizations.

8.4 Waste Diversion Information System (WDIS)

The proposed WDIS comprises a number of computer functions which manage waste diversion data. The functions include:

- Monitoring attainment of the provincial waste reduction targets;
- Maintaining an inventory of waste processing facilities:
- Estimating waste disposal for facilities without weigh scales or estimating models;
- Recording diversion by municipalities against provincial diversion targets;
- Recording diversion by IC&I organizations against waste audits and

workplans and packaging audits and workplans;

- Monitoring 3Rs funding programs;

- Monitor disposal and diversion for waste management system areas; and

- Forecasting waste disposal and diversion for municipalities or waste management system areas.

The Ministry plans to provide direct computer access to WDIS in 1993 in order to minimize the number of printed reports required. Security measures will be in place to protect confidential data pertaining to waste diversion and disposal. In addition, the Ministry will provide the specifications required to exchange data electronically to IC&I organizations or independent software vendors. The Ministry encourages the development of electronic data exchanges both in submitting and retrieving data.

8.5 Forecasting Models

The Ministry is developing methods to estimate 3Rs diversion tonnages. Once these models have been evaluated and tested, they will be published for comment. Waste managers in those areas without weigh scales or other accurate monitoring methods can use the models to estimate disposal and diversion. The forecasting models will be available for use by planners developing waste management system plans or those identifying material recovery facility requirements.

8.6 Communicating Progress

The Ministry will report the provincial diversion and disposal totals on a quarterly basis. Case studies of initiatives that achieve high diversion rates will be published as will other information about diversion opportunities.

The Ministry hopes to improve its communication with municipalities and IC&I sectors and will provide them with the following:

- Reports on disposal and diversion to organizations submitting data;

- Reports showing attainment against provincial targets; and

- Available figures explaining external causes that affected base figures (e.g. recession, free trade, population variances).

9.0 CONCLUSION

To foster greater efforts by the municipal and IC&I sectors to minimize waste, the Ministry continues to provide support through technical outreach, information papers, funding programs, and development of the Waste Diversion Information System.

The Ministry views the management of waste as a significant mechanism for conserving Ontario's resources and environment. Ontarians working together can develop a conserver society and become leaders in developing ways to minimize waste and maximize secondary resource usage.

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
400	Glass	Clear Beverage	Clear wine bottle, juice bottle
410		Coloured Beverage	Beer Bottle, Coloured wine bottle
420		Mixed Beverage	Clear and coloured bottles
430		Clear Container	Jam jars, pickle bottles
440		Coloured Container	
480		Mixed Glass	Comingled glass container & beverage
490		Other Glass	Heat resistant glass, laminated glass, wired glass, mirrors, plate glass, mineral wool, wool glass, light bulbs or tubes, glass blocks or brick, insulators
499		Composite Glass	Predominantly glass
500	Paper	Corrugated	Corrugated, old boxes, corrugated new cuttings
510		News Print	News, printed (old and overissued) unprinted, other groundwood, sulphate
520		Boxboard	Boxboard cuttings, mill wrappings
530		Fine Paper	Office, computer, ledger
580		Mixed Paper	Comingled classified paper
590		Other Paper	Kraft, magazines, coated paper, carbon paper
599		Composite Paper	Predominantly paper
600	Wood (Processed)	Packaging	Pallets, skids, crates
610		Mfg Residual	Offcuts, chips, shavings, sander dust, sawdust
620		Building Material	Veneer, lathing, flooring, doors, frames, lumber, forms, mouldings
680		Mixed Wood	Comingled classified wood
690		Other Wood	Treated wood, painted wood, plywood, chipboard, particleboard
699		Composite Wood	Predominantly wood
700	Vegetation	Leaf & Yard	Hay, straw, grass clippings
710		Brush	
720		Stumps	
780		Mixed Vegetation	Comingled vegetation
790		Other Vegetation	Non-classified vegetation
799		Composite Vegetation	Predominantly vegetation

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
800	Food	Fruit/Vegetables	
810		Protein	Meat, Fish, Poultry
820		Fats/Oils	
830		Grain Dust	
840		Bones	Carcasses
880		Mixed Food	Comingled food
890		Other Food	Stale dated food, condemned food
899		Composite Food	Predominantly Food
900	Metal	Ferrous Metal	Iron, steel (e.g. magnetic)
910		Aluminum	Cans, car parts, poil, wiring, tubes
980		Mixed Metal	
990		Other Non-ferrous Metal	Brass, lead, copper
999		Composite Metal	Predominantly metal
1000	Plastic	PET	2 litre plastic soft drink bottles, plastic liquor bottles, some vegetable oil and bottled water bottles.
1010		Other Thermoplastic	HDPE (milk jugs, large food tubs, motor oil bottles, most shampoo bottles, "krinkly" grocery bags, plastic pails). LDPE (shiny grocery bags, most grocery bags, plastic container lids, bread bags). PP (margarine and yogurt tubs, small tubs, syrup bottles). PS ("formed" disposable cups and plates, fragile clear plastic cups), PS is used for all disposable packages cutlery etc. used by fast food chains.
1020		Thermoset Plastic	ABS e.g. computer and telephone housings. PVC e.g. sewer & water pipes, some house d\siding, floor and wall covering, some consumer bottles.
1080		Mixed Plastic	Comingled plastic
1099		Composite Plastic	Predominantly plastic
1100	Textile/Fabric	Natural Fibre	Wool, cotton, linen, leather
1110		Manmade Fibre	Nylon, acrylic, polyester
1180		Mixed Textile	Comingled classified textile
1199		Composite Textile	Predominantly textile/fabric

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
1200	Rubber	Tires	
1210		Hose, Belting	
1220		Foam	Carpet underlay
1230		Rigid	Shoes, auto mounts
1240		Sheet	Innertubes, floor mat
1280		Mixed Rubber	Comingled classified rubber
1290		Other Rubber	Non-classified rubber
1299		Composite Rubber	Predominantly rubber
1399	Asphalt	Composite Asphalt	Predominantly asphalt
1499	Drywall	Composite Drywall	Predominantly Drywall
1500	Earth Material	Soil	Clay, sand, dirt
1510		Aggregate	Gravel, rock
1520		Concrete Products	Concrete, plaster, rubble
1580		Mixed Earth	Comingled earth material
1590		Other Earth Material	Non-classified earth material
1599		Composite Earth Material	Catch Basin Cleanings, Street Sweepings
1600	Ash	Fly Ash	
1610		Bottom Ash	
1680		Mixed Ash	Comingled ash
1699		Composite Ash	Predominantly ash
1799	Asbestos	Composite Asbestos	Predominantly asbestos
1899	Sludge/Filter Cake	Composite Sludge	Predominantly sludge
1900	Composite Materials	Electronical Equipment	T.V., Stove, fridge, microwave, stereo, motors
1910		Furniture	Table, chair, bed
1930		Diapers	
1940		Household Hazardous Waste	Batteries, paints/solvents, household cleaners, motor oil
1970		Mixed Dry Waste	Comingled dry materials
1975		Mixed Wet Waste	Comingled wet materials
1980		Mixed Solid Waste	Mixed materials (wet & dry)

REDUCE
REUSE
RECYCLE

THE WASTE CRISIS IN THE GREATER TORONTO AREA

A Provincial Strategy for Action

Ontario
Environment
Environnement

Ontario
Office for the Greater Toronto Area
Bureau de la région du grand Toronto

Disponible en français

PREFACE

This paper outlines a series of actions to be undertaken by the Government of Ontario to resolve the waste crisis in the Greater Toronto Area (GTA). These actions fall into three categories:

- o Actions to accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly;

- o Actions to increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the principles of environmental assessment; and

- o Emergency actions to close the "disposal gap" or expected shortfall in waste disposal capacity between the time that existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

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INTRODUCTION

Much Has Happened, Much Remains To Be Done

Ontario is a world leader in the conserver approach to waste management. Enormous strides have been made to divert the huge amount of municipal solid waste we generate from disposal to productive uses through the 3Rs of waste management - reduction, reuse and recycling. These achievements are testimony to the level of partnership and commitment to action by municipal and provincial governments, by industry, labour, environmental and community groups, as well as by individuals.

Nevertheless, much more remains to be done in a very short timeframe to ensure that the provincial targets of at least 25 per cent waste diversion from disposal by 1992 and at least 50 per cent by the year 2000 are to be achieved.

The need to speed up waste reduction efforts in the province was addressed by the Minister of the Environment on February 21, 1991 with the announcement of a series of regulatory, financial and policy initiatives comprising *Ontario's Waste Reduction Action Plan*. To oversee implementation of the plan and other waste reduction initiatives province-wide, the Waste Reduction Office was created within the Ministry of the Environment.

However, even when the provincial waste reduction targets are actually achieved, there will still be a substantial amount of "residual waste" requiring disposal. Residual wastes are the materials left over after we have fully reduced, reused and recycled. Environmentally-secure disposal is the only responsible option for managing these wastes. Yet, the amount of available disposal capacity in Ontario is rapidly diminishing. Many municipalities will experience a "waste crisis" by the mid-1990s. Some have already reached that critical stage.

The Waste Crisis in the Greater Toronto Area

Nowhere in the province are the dimensions of the waste crisis as obvious and as challenging as in the Greater Toronto Area.

The Greater Toronto Area (GTA) is a highly integrated metropolis which includes the Municipality of Metropolitan Toronto and the Regional Municipalities of Peel, York, Durham and Halton. Within these five "upper-tier" municipalities, there are 30 "lower-tier" municipalities. The population of the GTA is 3.9 million.

Though the GTA accounts for less than one per cent of Ontario's land area, it has a disproportionate environmental and economic impact on the rest of the province. It contains 44 per cent of Ontario's total population, provides about 40 per cent of Ontario's total economic output, and about 45 per cent of the province's employment base.

With the 4.7 million tonnes of solid waste it produces every year, the GTA also accounts for nearly half of Ontario's total waste stream. Person-for-person, this level of waste generation is one of the highest in the world and it puts an enormous strain on the GTA's disposal capacity. Even with an effective waste reduction program, the need to dispose of residual wastes in the GTA will likely increase, as population is expected to grow to 6 million by the year 2021.

The problems surrounding waste management in the Greater Toronto Area have already reached a critical stage. Important waste reduction initiatives undertaken by GTA municipalities such as increased tipping fees at landfills, comprehensive residential blue box programs, home composting, central composting, bans on recyclable material going to disposal, and an extensive public education program, have helped substantially to reduce the demand for residual waste disposal, but not enough to appreciably extend the life of the GTA's three available landfills: Britannia Road (Peel Region), Keele Valley (York Region) and Brock West (Durham Region).

As of January 1, 1991, the GTA had only 9.4 million tonnes of remaining residual waste disposal capacity. With the exception of Halton Region, which has an approved landfill scheduled to begin operation in 1992, waste disposal capacity in the rest of the GTA will start to expire in spring 1992 and will be completely exhausted by mid-1994.

EXISTING LANDFILL SITES	WASTE ACCEPTED Million Tonnes Per Year	REMAINING CAPACITY in Million Tonnes	SCHEDULED CLOSURE
Britannia Road	0.6	0.7	Spring 1992
Brock West	0.5	0.5	Spring 1992
Keele Valley	2.7	8.2	Summer 1994

The Disposal "Gap"

The first priority is the reduction of waste. Nevertheless, when the GTA reaches the provincially-mandated waste diversion targets (at least 25 per cent by 1992 and at least 50 per cent by the year 2000), large quantities of residual waste will still need to be disposed. The search for new landfill sites has begun. But a waste disposal "gap" will occur when existing capacity expires before new capacity is in place.

The size of the gap (the excess of residual waste demand over capacity), will depend upon the success of waste reduction and how soon new landfill sites can be put into operation. It is expected that new sites can be found, approved and opened some time in 1995: at least 2.5 years after the Britannia Road site reaches capacity and 9 months after the Keele Valley site reaches capacity. However, the time required for appropriate environmental assessments may extend this date.

In Search of a Solution

The problem of disposal capacity in the GTA was not entirely unforseen.

In Ontario, municipal governments are responsible for developing and operating environmentally-secure waste management facilities that keep pace with residential, commercial and industrial expansion. Municipalities use their waste management master plans and supporting documents as the tools for implementating landfills and other waste management system components. The plans are then submitted for approval under the Province's environmental assessment process. Such planning, including public consultation and the siting of disposal facilities, were undertaken by the upper-tier GTA municipalities during the 1980s. Thus far, however, only Halton Region has received approval for its plan and a 2.0 million-tonne landfill site to accept only waste generated from within the Region.

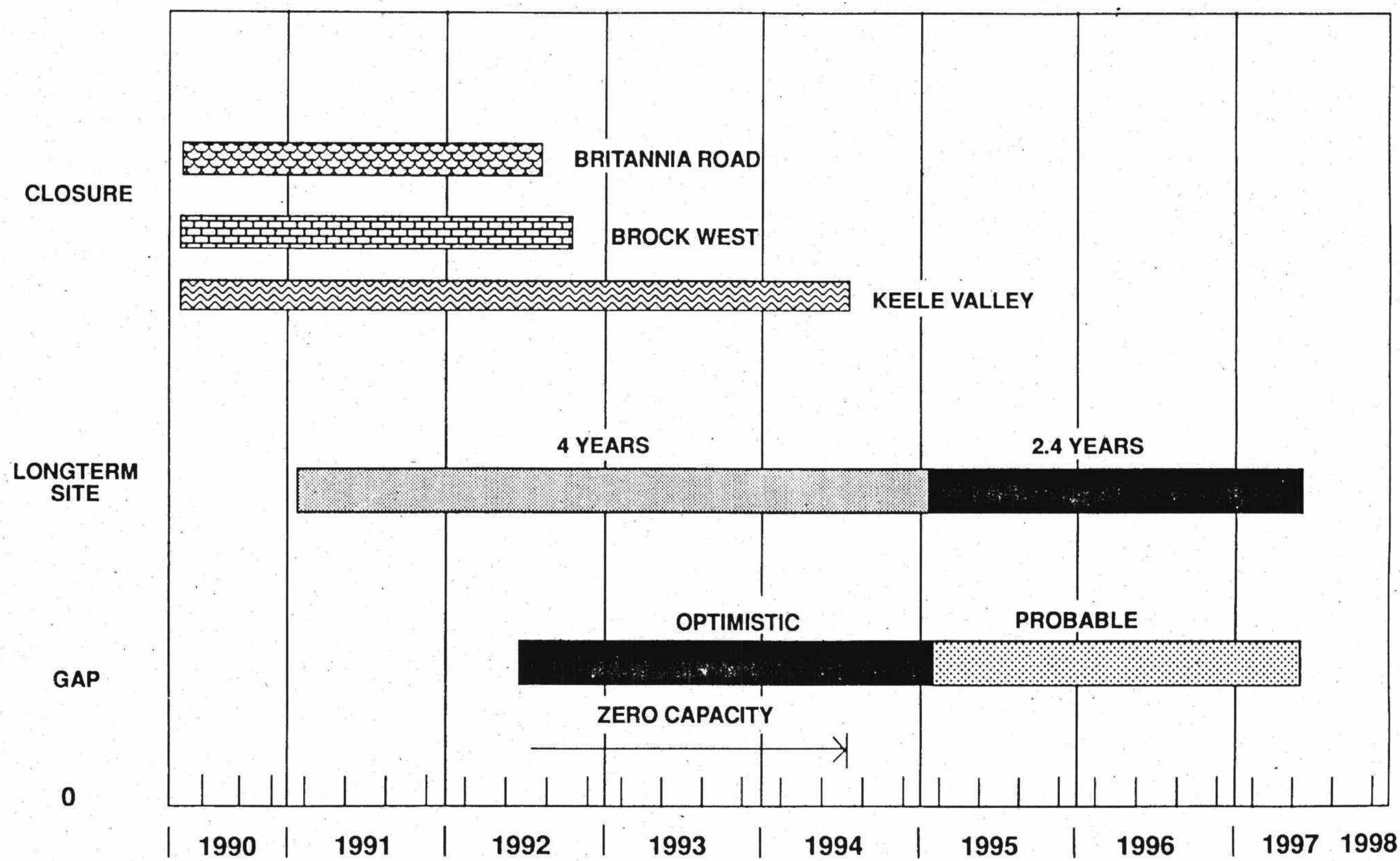
In March 1989, the Solid Waste Interim Steering Committee (SWISC) was formed when the Province brought together the five GTA regions to prepare a collaborative strategy for developing a solid waste management system.

SWISC was comprised of the Chairpersons of the Regional Municipalities and Metropolitan Toronto, and the Chairpersons of the respective Works Committees, as well as the Deputy Ministers of the Environment and the Office for the Greater Toronto Area.

SWISC was working to have long-term waste management facilities in place by 1996. In the short term, it identified two emergency landfill sites - in Whitevale (Durham Region) and Brampton (Peel Region) - to cover the shortfall in landfill capacity that was expected to occur between 1992 and 1996. These sites were granted exemptions from approvals under the *Environmental Assessment Act* by the previous government in July 1990.

On November 21, 1990, the Minister of the Enviroment in the current government announced a comprehensive waste management strategy for the province and the GTA, which

THE DISPOSAL GAP



included three initiatives:

- o Emphasis on waste reduction and reuse over recycling in the hierarchy of the 3Rs of waste management;

- o Changes to the *Environmental Assessment Act* process to keep it environmentally sensitive, while making it timely and cost-effective; and

- o Establishment of a new public sector authority to search for, select and start-up long-term landfill sites in the GTA consistent with the fundamental principles of the *Environmental Assessment Act*.

In addition, the Minister suspended exemptions to the *Environmental Assessment Act* which had been granted by the previous government to new short-term landfill sites in Whitevale and Brampton. The exemptions would have placed the sites in a faster approvals process under the *Environmental Protection Act*, but still not fast enough to avert the disposal gap.

The Minister also recognized SWISC's contribution, but indicated that the process designed by the previous government to solve the GTA waste crisis was not working fast enough. This announcement, in effect, concluded SWISC's formal site search activity and it became an advisory body to the Ministry on the role and mandate of the new public sector authority.

The public sector authority to search for new disposal capacity in the GTA was subsequently incorporated under the *Business Corporations Act* as the "Interim Waste Authority Ltd." With the creation of the Interim Waste Authority, under the jurisdiction of the Office of the Greater Toronto Area, the Solid Waste Interim Steering Committee was dissolved.

On April 2, 1991, the Minister Responsible for the Office for the Greater Toronto Area announced that the search for long-term waste disposal sites by the Interim Waste Authority would not include sites outside the GTA. Three landfill sites will be selected by the Authority: (a) a site in Durham Region servicing Durham's residual waste disposal needs; (b) a site in Peel Region servicing Peel's residual waste disposal needs; and (c) a site in Metropolitan Toronto or York Region to serve the residual waste disposal needs of these two upper-tier municipalities.

Providing Leadership

The Government of Ontario's program to deal with the waste crisis in the GTA is based on the principles of the conserver approach to waste management and includes the following:

- o Actions to accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly;

- o Actions to increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the fundamental principles of environmental assessment; and

- o Emergency actions to close the "disposal gap" or expected shortfall in waste disposal capacity between the time that existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

ACCELERATION OF WASTE REDUCTION AND DIVERSION PROGRAMS

Objective

To accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly.

Responsibility

Initiatives to accelerate waste reduction in the GTA, as described below, will be undertaken co-operatively by the upper-tier GTA municipalities and the Ministry of the Environment through its Waste Reduction Office. The Waste Reduction Office will provide the lead provincial role.

The Waste Reduction Office was established in February 1991 to co-ordinate the province-wide implementation of Ontario's Waste Reduction Action Plan and the development of other initiatives which will achieve the Province's waste reduction targets. Many of the initiatives in the GTA to be undertaken by the Waste Reduction Office will have important province-wide implications. The Office's key responsibilities in relation to GTA waste diversion and reduction efforts will be to co-ordinate the development and implementation of GTA action plans, to undertake the educational programs needed to achieve the successful implementation of the plans and to ensure that the programs, techniques and technologies employed are of the best and highest quality.

Guiding Principles

o *Partnership*: The development of an accelerated 3Rs program for the GTA will be a joint public and private sector and community effort involving the Province, the

upper-tier municipalities of the GTA, industries, community groups and broad cross-section of other stakeholder groups. The program will address workplace, household and institutional waste management needs and practices.

- *Environmental Integrity*: The siting and design of specific 3Rs facilities will be subject to a stringent but streamlined environmental approvals process.

- *Financial Stability*: Following consultation with the Province, the upper-tier municipalities will implement an accounting and pricing regime that will ensure that all users of waste management services will be charged in accordance with the long-term and ongoing technological, environmental and social costs of all aspects of waste management.

- *Technical Excellence*: The Waste Reduction Office will encourage and support such research and development as is required to monitor and evaluate the techniques, technologies and facilities established in conjunction with the GTA accelerated waste reduction and diversion program in order to ensure that they are of the highest quality.

- *Economic Benefits:* Implementation of the GTA's accelerated waste reduction and diversion program will entail substantial public and private sector investments. The Province of Ontario is committed to working in partnership with municipal governments and the private sector to maximize the economic benefits that flow from such expenditures. In particular, it will encourage and support the development and implementation of 3Rs techniques and technologies likely to find markets thoughout Ontario, across Canada and abroad.

- *Model Programs*: The accelerated 3Rs program developed for the GTA will meet or exceed provincial waste reduction targets, will be consistent with Ontario's Waste Reduction Action Plan and will provide a model for the implementation of waste

reduction and diversion programs across Ontario.

- o *Accountability*: Accountability to the environment and to future generations will be the hallmark of the accelerated 3Rs program developed for the GTA. Product stewardship will form the keystone of the GTA, as it will throughout Ontario.

- o *Conserver Society Values*: The Province of Ontario is committed to ensuring that the waste management practices that evolve as a result of public and private sector and community efforts in the GTA will move us toward a conserver society as reflected in our homes, workplaces, institutions and places of play.

Actions

1. *Authority and Responsibility*: Legislation will be introduced in fall 1991 that will give authority and responsibility for 3Rs activities to the upper-tier GTA municipalities with the option of delegating specific powers to their respective lower-tier municipalities. Some of the activities which may be covered under the legislation include: planning, financing, designing, siting and constructing 3Rs facilities such as composting plants and materials recovery facilities (MRFs); requiring source separation of designated recyclable materials; establishing special collection systems for designated recyclable materials; and specifying the 3Rs treatment/disposal facilities to which waste generators may send waste. Implementation of 3Rs facilities will be expedited through amendments to the approvals process.

2. *Advisory Committee*: The Waste Reduction Office will co-ordinate the establishment and work of an inter-regional waste reduction advisory committee. The work of the committee will provide the Minister of the Environment with the best information available on the ways and means of best implementing an accelerated 3Rs program for the GTA. As well, the committee will assist in the development and promotion of the

program. It will include representatives of Metropolitan Toronto and the Regional Municipalities of the GTA (municipal waste reduction staff and works committee chairs), community and environmental groups, labour unions, educators, private sector recyclers, composters and waste generators.

3. *GTA Waste Reduction Action Plan*: In co-operation with the inter-regional waste advisory committee, the Waste Reduction Office will co-ordinate the preparation of a comprehensive Greater Toronto Area waste reduction action plan that will encompass both public and private sector initiatives.

4. *Regional Waste Reduction Action Plans*: Metropolitan Toronto and each Regional Municipality will be required to submit its own waste reduction action plan based on the requirements provided by the Ministry of the Environment. These plans will be submitted on specified dates for review and approval by the Ministry.

5. *Funding Arrangements*: The Province will begin discussion with the GTA Regional Municipalities and Metropolitan Toronto on the funding of 3Rs capital expenditures and implementation of a comprehensive GTA waste reduction action plan (*Action Item 3 above*).

6. *Facility Approvals*: The Ministry of the Environment will undertake legislative and policy initiatives which will facilitate approval of 3Rs facilities such as composting plants and materials recovery facilities.

7. *Evaluation*: The Waste Reduction Office will monitor and evaluate the waste reduction programs, facilities, technologies and techniques established in the GTA for applicability to other communities in Ontario.

8. *Contingency*: The Waste Reduction Office may initiate experimental and/or

contingency programs to complement the 3Rs activities of the GTA Regional Municipalities and Metropolitan Toronto.

IN SEARCH OF LONG-TERM LANDFILL SITES

Objective

To increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the principles of environmental assessment.

Responsibility

The Interim Waste Authority Ltd. has been established and incorporated under the *Business Corporations Act* with the mandate to:

- Find three landfill sites, one within each of the following site search areas: (a) the Regional Municipality of Durham to service its disposal needs; (b) the Regional Municipality of Peel to service its disposal needs; and (c) the Regional Municipality of York and the Municipality of Metropolitan Toronto to service their disposal needs; and

- Obtain environmental and other approvals for the sites, acquire the sites, construct and appropriately licence the sites.

Responsibility for managing and operating the sites will be determined through future discussions between the Province and upper-tier municipalities of the GTA. Hence, the "interim" nature of the current provincial authority.

Guiding Principles

- *Environmental Integrity*: It must be demonstrated that the sites were selected and established in accordance with the fundamental principles of the *Environmental*

Assessment Act and with prudent regard for the importance of protecting the health and environment of citizens.

- *Local Responsibility*: Residual waste must be disposed of as close to the source of waste generation as possible. Long-term waste disposal facilities will be developed within three service areas of the GTA: Durham Region, Peel Region, and York Region and Metropolitan Toronto to satisfy their respective disposal needs. Each site, however, will be allowed to accept waste from other GTA Regions should there, for one reason or another, be difficulties with one particular site. Halton Region has an approved landfill under construction which will meet its disposal needs.

- *Compatibility with Conserver Principles*: The size and type of disposal facilities should not have a negative impact on waste reduction activities. Incineration, because it requires a large volume and constant flow of waste to justify the capital and operating costs, is not an acceptable option under the conserver approach to waste management. Thus, on April 11, 1991, the Minister of the Environment announced a new government policy that there would be no future solid municipal waste incinerators in Ontario.

- *Financial Sustainability*: All costs incurred by the Province in the selection, acquisition, construction and commissioning of sites will be recovered from future tipping fees when the sites are open.

- *Public Involvement*: The site selection process will respect government policy requiring effective, open, and meaningful public participation in the site selection process.

Actions

1. Three firms leading inter-disciplinary teams of consultants have been hired by the Interim Waste Authority Ltd. to begin the search for three landfill sites and to design and implement a public consultation program.

2. Assessment Design Documents (ADDs) for each of the three site search areas, will be prepared and released by the Interim Waste Authority for public consultation. The three documents will describe the proposed approach, purpose, search area, criteria to be used in selecting sites, alternatives to be considered, and a discussion on issues such as compensation and participant funding.

3. Legislation will be introduced in fall 1991 regarding the Interim Waste Authority and its site search activities and approvals process.

CLOSING THE "DISPOSAL GAP"

Objective

To close the "disposal gap" or expected shortfall in residual waste disposal capacity between the time that the existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

Responsibility

Public health and environmental security would be put at risk if a disposal gap were to actually take place in the GTA. The result would be a massive amount of garbage accumulating on public and private properties. Such a situation would not be tolerated by the affected communities. Though the "disposal gap" is expected to begin in spring 1992, and while every effort will be made to help extend current disposal capacity through an intensified 3Rs program, the lead time for the design and start-up of short-term disposal options necessitate almost immediate application of the emergency power provided under Section 29 of the *Environmental Protection Act* to the Minister of the Environment.

Section 29 of the *Environmental Protection Act* provides the Minister of the Environment with the power to order a municipality to "forthwith do every possible act and thing in its power" to ensure that waste be "collected or a waste management system or any part thereof be established, maintained, operated, improved, extended, enlarged, altered, repaired or replaced." This power is only used in exceptional circumstances where the Minister believes that it is in the public interest to provide emergency disposal capacity.

Guiding Principles

- *Stringent Application of the 3Rs*: Every effort will be made to limit the amount of waste through an accelerated 3Rs program, and thus extend current landfill capacity.

- o *Local Responsibility*: Residual waste should be disposed of as close to the source of generation as possible.

- o *Environmental Integrity*: Emergency disposal facilities will be designed with optimal environmental security measures.

- o *Public Involvement*: The design, development and monitoring of emergency disposal capacity will involve local affected communities.

Evaluation of Options

In arriving at a strategy for dealing with the disposal gap, the following options were considered:

1. *Stretching the capacity of existing sites:* Waste deposited at landfills is compacted so that as much as possible can be put into a given space. It is regularly covered with soil to prevent problems such as odour and vermin. The question is whether technology exists which can reduce the volumes still further so that even more waste can be deposited in the same space as currently approved.

   The Ministry of the Environment examined the following options for stretching the capacity of the three existing GTA landfill sites:

- o *Shredding: the shearing or milling of solid waste into small pieces.*

  Shredding is not currently practiced in Ontario. Its reported advantages are that it increases in-place waste density, reduces daily cover requirements, and is said to reduce debris, odour and vermin problems and generally improves site appearance.

- *Baling: high-density compaction of solid waste into dense rectangular bales.*

  There are no known baling operations for landfill in Canada. The reported advantages are similar to those for shredding.

  The drawbacks to both shredding and baling include the very high capital and operating costs involved, particularly when considered in terms of the remaining lifespan of the sites, unavailability of space for the related equipment and facilities, the high frequency of equipment breakdown and the limitations of the technology (not everything can be shredded or baled) which necessitates separate handling of some material. In addition, traditional compaction methods apparently achieve comparable in-place densities, but without the slowdown in the rate of decomposition which can result from shredding and baling operations. Potential space savings from shredding and baling are therefore considered to be minimal.

- *Landfill Mining: the excavation of previously buried waste to reclaim recyclables and organic soil for cover, freeing up capacity for new waste disposal.*

  This is a new concept which has not been attempted in Canada and only to a limited extent in the United States. It appears to work well in warmer climates where decomposition occurs quickly. Costs can be offset by savings in cover requirements, but the technique carries the potential of explosions, noise, odour and other impacts, and exposes workers to hazards. It is not considered a feasible method for a short-term extension of the existing GTA landfill sites.

- *Synthetic Daily Cover: using foam instead of soil to cover garbage.*

  A synthetic landfill cover has a much lower volume than conventional ground cover. Therefore, the site fills up less quickly. However, the material used is a urea-formaldehyde-based foam. Not enough is known about its toxicity, its impact on

leachate quality (leachate is the liquid formed when rain and snow infiltrate the site and mix with the waste), and its off-site environmental impacts. The foam presents practical problems as well. It washes off during rainstorms; when dry it can be blown away by high winds. In cold weather it requires warm water to activate it. The foam does not discourage birds, rodents and vermin.

Overall, the above technologies are not considered feasible solutions to the disposal gap problem in the GTA.

o *Surcharging: placing extra cover material or waste in a site without going beyond the planned contours but in such a ways as to accelerate settlement.*

Landfills naturally settle over time as wastes consolidate, collapse or decompose. The accelerated settlement achieved through surcharging permits the addition of waste beyond normal site capacity without changing the planned height or contour of the site. Metropolitan Toronto and Peel Region are successfully utilizing the surcharging of cover material at the three existing landfill sites to increase site settlement rates where possible. While a complementary option to overbuilding (see below), the surcharging option will not result in sufficient emergency disposal capacity.

2. *Moving the waste to other existing landfill sites within the GTA*: There are eight other landfill sites within the GTA, but their capacities are so small that their use would make virtually no difference to the disposal gap situation. Moreover, it does not make sense to disseminate GTA waste to a number of small sites, filling them up and causing capacity problems in those areas.

3. *Establishing temporary landfill sites within the GTA:* The Whitevale and Brampton sites had been chosen to provide interim landfill capacity for the GTA pending the establishment of new long-term capacity. It was the decision of the previous government to exempt these sites from the review and hearing process laid down in

the *Environmental Assessment Act*, a process which landfill sites are required to undergo.

This government, as demonstrated by the suspension of the two exemptions, is not prepared to permit new interim sites to be developed without going through a full environmental assessment process. The time required for the process would preclude the establishment of short-term sites to avoid the disposal gap.

4. *Transporting wastes to sites outside of the GTA*: This option for the long-term management of wastes is not acceptable. For the short-term management of wastes during the disposal gap, it is also not viable because of the large volumes involved. It will also simply result in a redistribution of waste, thereby transferring the waste crisis to communities outside of the GTA. However, transportation of wastes may be considered a feasible option in the event the GTA is only a few weeks or months away from having new landfill sites in operation.

5. *"Lifts" at the existing sites*: A lift, as it is commonly known, generally increases the height of a landfill beyond that originally proposed. Substantial new disposal capacity can be achieved in this manner.

   Lifts are considered to be technically and environmentally feasible for the Keele Valley and the Britannia Road landfills. On the other hand, the Brock West landfill is not considered to be a suitable candidate for a lift. It is older than the other two sites and not as well engineered. Its clay liner is experimental. A lift at Brock West could cause the liner/leachate system, and possibly the gas collection system, to fail.

Actions

1. *Lifts*: Metropolitan Toronto and the Regional Municipality of Peel will be directed to

increase the heights of the Britannia Road and Keele Valley landfill sites beginning in 1992 and 1994, respectively.

LIFT	LANDFILL SITE	TIMING
A	Britannia Road	Spring 1992
B	Keele Valley	Summer 1994

2. *Transfer Station:* A transfer station will need to be built to facilitate transport of wastes to the Keele Valley landfill from Durham Region. (The Keele Valley landfill is currently approved to serve Durham Region.)

3. *Environmental Impact*: The upper-tier GTA municipalities will be required to undertake additional, detailed studies to ensure that the lifts can be undertaken in a manner which meets the criterion of environmental integrity.

4. *Public Involvement*: Public liaison committees, representing communities adjacent to the Keele Valley and Britannia Road landfill sites, will be invited to participate in the development of engineering studies and implementation of the lifts.

5. *Legislation*: Legislation will be introduced to enable the lifts to be implemented.

6. *Funding Arrangements*: As part of the discussion process proposed in actions to accelerate the implementation of 3Rs programs in the GTA, the Province will establish an agreement with the upper-tier GTA municipalities with respect to funding the costs of closing the disposal gap.

A SHARED COMMITMENT

The initiatives contained in this provincial strategy to resolve the waste crisis in the Greater Toronto Area are far-reaching in scope. They also reflect the difficult challenges which face the provincial government and its municipal partners in dealing with the waste crisis not only in the GTA, but throughout Ontario. However, with a new shared commitment to moving Ontario forward towards a conserver society, where the goals of economic well-being exist in a natural harmony with the environment, these challenges will be overcome.

If you have comments on the provincial strategy to resolve the GTA waste crisis please write to:

Hon. Ruth Grier
Minister of the Environment
and Minister Responsible for the Office for the Greater Toronto Area
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Additional copies of *The Waste Crisis in the Greater Toronto Area: A Provincial Strategy for Action* may be obtained by contacting:

Ministry of the Environment
Public Information Centre
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

(416) 323-4321

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APPENDIX C

Summary of Comments Consulted

References of Public Consultation Materials Consulted

Comment/Response Summary

APPENDIX C

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES

Reference Document/ Source	Comment
REVIEW OF IWA - PEEL REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
EA Document II, Part 1, Volume 2 of 2, April 1992	Location for a large material recovery facility should be found.
	Consider composting at the municipal level.
	3Rs programs should be mandatory.
	Government should immediately pass legislation against over-packaging.
	Diversion not pursued as aggressively as possible.
	Not enough recycling facilities in place.
	Need more extensive recycling programs.
	Implement a User Pay system for garbage generated at residences.
	Educate children in schools about environment.
	Tax industries creating garbage and excess packaging.
	Increase public awareness of what an individual can do.
	Incineration and recycling is sophisticated in Japan, why can't we borrow technology?
	Need separate recycling bins outside shopping malls, especially cardboard.
	Should have note attached to items left behind, after blue box collection.
	Should be legal to scavenge for items from landfill sites.
	Tires are diverted from landfill, and yet extraordinary charges are being levied to remove them.
EA Document III, Volume 2 of 3, November 1992	Waste disposal methods similar to the Eco Farms Waste Management System should be considered. With this system, waste is separated into different materials and reprocessed back into raw materials to be used again. Organic material is reused as organic fertilizer and compost. This system was researched for seven years and was proven to reduce waste material by up to 95%.
	Waste reduction should be a priority.
	Why does Minister Grier put greater emphasis on recycling and incineration?

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Besides incineration, other waste disposal alternatives should be considered. For example, Europeans use sophisticated sorting facilities which feed pyrolysis or gasification plants. The sorting facility recycles many of the inorganic wastes while the gasification/ pyrolysis section produces petroleum gases and liquids. These are later separated into feed stocks for reuse in industry or for energy production. The final portion of waste that cannot be reclaimed or converted must be volumetrically reduced through high temperature incineration and the ash then landfilled. Such plants would be local to each community, thereby reducing truck traffic and providing employment opportunities. The "Not in My Backyard" syndrome would be eliminated since each community would become responsible for its own waste.
	Anaerobic digesters should be promoted as a viable option for disposing of large quantities of compostable waste.
	Despite the abundance of alternative waste disposal methods, the Ontario Government has stopped or significantly reduced efforts to find alternatives for disposing of municipal waste. The effort is limited to the grass roots household level.
	In terms of alternatives, it is recognized that some landfill capacity is required. The size of the proposed site however, does not appear to be consistent with the efforts to reduce, reuse and recycle.
	Not enough is being done to find alternative approaches to waste other than landfill. Greater efforts to reduce, reuse and recycle materials could be made and incineration is now feasible alternative, considering modern engineering techniques.
	We do not want to have to resort to drastic measures in order to get rid of our garbage. For example: garbage police, dumping in streets and near homes, and forced recycling.
	Are there any other plans for waste reduction in Toronto (i.e. user fees)?
	There is no such thing as a "safe site". Waste is waste! The solution lies in reducing waste and you do that by hitting the people in the pocket book, not by destroying the environment. Governments should charge each person for the amount of garbage they produce.
	The following alternatives to dumping should be considered: · eliminate economic subsidies to industry · mandate source separation · deposit on all beverage containers · pay by the bag for garbage disposal · product stewardship.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
Peel Public Comment Database	More controls on generation of waste should be considered: · user fees · reduction of packaging · laws that prevent consumers from waste generating.
	In Germany and Switzerland all waste is hand-sorted to make sure that recyclable materials and HHW, including batteries, are removed from the waste being landfilled. This should happen in Canada too.
	Whoever makes garbage should take care of it. Why don't you deal with packaging?
	Emphasis should be on reduction (of waste). Styrofoam and other similar products should be banned.
	Why don't we recycle rugs?
	Why isn't recycling mandatory?
	Should incorporate 3Rs beyond that 50% goal.
	We want recycling plants to save the productive farmland.
	One of the most advanced composting systems in the world has been developed right here in Ontario - use it.
	I would like to see composting increase, especially of yard waste.
	Pleased with the Ministry's efforts to extend recycling program to Ontario residents from 50% to 90% by 1995. Wondering if there are any other plans for waste reduction in Toronto, such as implementation of user fees.
	The IWA could examine the work being done by companies such as Eco Farms Waste Management Inc. which argue that they can reduce the amount of material going to landfill by 95%.
	I am also strongly in favour of more stringent controls on our garbage quota of recycling, reusing and reducing waste.
	If more money was spent on 3Rs, we would not need landfill.
	If the government was to force the manufacturers to produce recyclable/reusable products, then the problem would be solved.
	Mandate source separation, deposits on all beverage containers, pay by the bag for garbage disposal, product stewardship.
	Nothing has been done to decrease garbage by incentives to industry or families.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Find a way to sort waste so that paper, metals, plastics, wood and stone and their compounds are kept away from landfill and are recycled. Force product manufacturers and distributors to outline and guarantee non-landfill disposal for the items they sell.
	I believe the solution to Toronto's garbage lies in reducing the amount produced, levying realistic charges on disposal such that it is economic to recycle, so that recycling is not just seen as a good citizen's act.
	Companies, which are making good money on the products we use, should be taking their containers back.
	We request that alternatives be considered like almost total recycling by which garbage is reduced up to 50%; as ESDEX Recycling Corp. of Cookstown.
	A better approach would be to decentralize these facilities. Multi-technology plants would begin with sorting facilities to complete the recycling step. The non-recyclable portion would be transferred to a plant where the organic portion could be converted into industrial feed stocks. This step could include gasification, pyrolysis or anaerobic digestion. Finally, the portion that cannot be reclaimed or converted must be volumetrically reduced through high temperature incineration and the ash landfilled.
	It has been stated by some municipalities that the Blue Box program is too costly. What alternatives are there? Why do we have to store recyclable in warehouses? We must create markets and support initiatives from the private sector to conduct these recycled products into reusable commodities.
	Bill 143 states that it will become compulsory for the IC&I sector to have waste audits and definite plans of action to divert their waste from landfill. How about the residential waste: What will the revenue collected from the site be used for?
	We petition you and the government to start now to expedite alternatives to landfills. It is not only enough to provide blue boxes. We must constantly encourage and educate our population on the 3Rs. We must legislate over-packaging. We must reward developers and producers of biologically acceptable products. We must carefully follow and support the new technology which is becoming more and more ecologically viable.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
REVIEW OF IWA - DURHAM REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
Zero Garbage / Scugog Brief to C.E. McIntyre, IWA 13 July 1992	
Bill Lishman, A New Idea	Proposal for waste de-production facilities that would be responsible for reclaiming/recycling one stream of waste, i.e. small appliances, white goods, etc.
	No mass facilities only small facilities specializing in individual waste streams.
	Facilities would also be responsible for conducting research into recycling and reclamation of their particular waste stream.
	Also communities could host composting facilities.
	User-pay system would apply to all unsorted waste.
Bob Almack	Serious reduction and intensive recycling similar to North Hempstead, New York or Camden County, New Jersey.
	Present targets too conservative.
	Tough legislation to implement resource management rather than waste management.
	Source separate to get recyclable, repair and reclaimable, compostables and toxins out of the waste stream.
Submission of Briefs, Session July 13, 1992, at the Northview Community Centre, Oshawa - Meeting Notes	Manufacturers should have strict packaging laws.
	Collect garbage in paper sacks.
EA Document II, Part 1, Volume 2 of 2, April 1992	Need financial incentive to recycle.
	Lack of 3Rs initiatives and commitments in the Region.
	Will there be compensation to municipalities for enhanced recycling programs or penalties for not reaching appropriate levels of recycling?
	Will there be regulatory measures for waste reduction, i.e. ensuring a refund on bottles?
	Should be reusing and recycling items in old landfill sites - this would increase landfill capacity and create jobs.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Need more recycling and reusing especially at the manufacturer's level.
	Will there be financial stimulus to encourage recycling?
	Tax relief should be provided to communities reducing garbage.
	Pay-per-use policy could be an incentive.
	Federal government needs to get more involved in regulating packaging (i.e. returnable and refillable).
	Manufacturers must "close the loop" by being responsible for disposing of their own products after consumers have finished with them.
EA Document III Volume 2 of 3, November 1992	Have they ever considered putting leaf compost in farm fields?
	First priority must be reduction but reduction will not happen without legislative assistance, and unless the urban producers are made aware of the garbage problem.
	Present waste diversion estimates are too conservative.
	Consider product stewardship.
	Mandatory reuse standards for consumer goods so that wastage and packaging is minimized, and life expectancy is maximized.
	Why doesn't the government go to the source and reduce waste?
	Government should establish laws to stop the manufacturing of non-environmentally friendly packaging.
	Need to approach companies to reduce the amount of wrapping they use, and to reduce garbage from construction.
REVIEW OF IWA - METROPOLITAN TORONTO/YORK REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
EA Document III, Volume 2 of 3, November 1992	The IWA should emulate the "Green Dot Law" in Germany.
	Stricter policies regarding the 3Rs have to be implemented. These policies would include: · the government must put more effort into building markets for recycled products and materials · enforce businesses to conform to waste audits · residents of Ontario should pay more for waste disposal - this would lead to a reduction of waste generated.
	Alternative methods of landfilling should be examined. These would include: Eco Farms, the Martin System and Euro-Tech.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	A resolution of York Region Council was that the IWA process should be interrupted in order to assess the viability of waste processing as an alternative to a large landfill. Georgina Against Garbage (GAG) conveyed to Council that technology exists which can extract up to 95% of waste products from the waste stream.
EA Document II, Part 1, Volume 2 of 2, April 1992	Use separation companies for economic, efficient handling of waste within big cities.
	Intensify reduce and reuse.
	Mandate waste reduction and recycling.
	Expand fine paper recycling.
	Encourage positive local action - e.g. composting.
	Have recycling centres located at the landfill site.
	Return goods to their sources.
	Reuse scrap residues.
	Encourage reduced packaging - need an education campaign.
	Include aluminum in blue box pick-up.
	How are municipalities to fund 3Rs programs, policing of illegal dumping and special services such as "toxic taxis" and composting?
	Metro Toronto needs incentives to reduce the amount of garbage it produces.
Comments form IWA Metro/York Landfill Site Search Public Consultation Database	Move toward complete reduction and recycling as soon as possible.
	Decreases the amount of packaging that manufacturers create.
	All by-products of today's society should not be dumped in a hole; instead by-products should be separated and stored in above ground storage units. Also, biodegradable materials should be shredded and distributed as garden mulch.
	Start reprocessing garbage instead of dumping it.
	Reduction at-source waste should be managed using best available technology.
	If Metro Toronto cannot handle their own waste disposal, you should be instituting new regulations for the reduction of waste in that city.
	Why don't we divert our energies to reducing garbage everywhere and not trying to find a place to put it.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Recycling should be implemented.
	Something needs to be done to enforce reducing waste.
	Get big business to change their packaging to disposables, charge a tax based on garbage generation, and increase peoples awareness to recycling and composting.
	One should invest in recycling facilities at any cost. User fees should go into waste management research and processes.
	We need to recycle, reuse and reduce. We also need to create constructive uses out of waste.
	Solid uncombustible waste has been compacted into solid blocks and used for such applications as blocks for roadbeds in Europe.
	Recycle more, produce less garbage, educate people and get them participating.
	Increase diversion strategies and further development of technologies for recycling post-consumer waste and markets for the resulting products.
	The government must put more effort into building markets for recycled products and materials, enforce businesses to conform to waste audits and regulate packaging.
	The government must look at alternatives including Wet/Dry sorts, municipal composting for residents.
	The Blue Box program should become the "normal" method of collection for glass, aluminum, and steel economic recycling materials, with fibreboard and paper as loss leaders. This collection should be free.
	Producers of containers must be made responsible for the collection of their unwanted products. Also, advertising should be restricted to the air waves not to newsprint.
	All discarded materials should be sorted, separated, crushed, compacted and stored in above-ground containers so that when our technology improves the resources stored can be readily reused.
	Nothing we have should be destroyed, it must be reused and recycled.
	Eco Farms approach should be used.
	Mandatory municipal recycling programs should be initiated to reduce waste going to landfills.
	Give incentives to reduce waste and penalties for excess packaging.
	Encourage more recycling.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Apartments should be recycling. Excess packaging of food products should be eliminated.
	Government should convince the manufacturing sector to build repairable items.
	Government needs to promote a market for recyclables.
	Government should enact legislation which would force manufacturers to be required to take back their products and packaging - product stewardship.
	Government should promote 3Rs more.
	Government should be putting money into recycling and educating the public.
	Government should initiate a program to tell us what to throw out and what to recycle.
	Instead of 3 landfill sites in the GTA, why not establish a large waste recovery plant and only landfill the residue.
	Landfill bans, recycling and composting should all be enforced. Random checks of household waste could be done - similar to the RIDE program.
	Need to expand recycling efforts - especially in Metro Toronto.
	Should consider legislation to prevent sale of non-recyclable materials in stores.
Notes Taken at an Information Centre on Waste Diversion in the Greater Toronto Area, Tuesday, August 18, 1992, Community Information Centre, King City	Is it possible to accelerate 3Rs to increase diversion now?
	Will MOE ensure that recycling facilities will be approved so that the diversion targets can be achieved?
Notes Taken at an Information Centre on Waste Diversion in the Greater Toronto Area, Thursday, July 23, 1992, Community Information Centre, Stouffville	What portion of the organic waste stream is from restaurants, groceries and is any pressure being put on them to compost?
	What is being done to eliminate excessive packaging?

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Is it economically feasible to use recycled products as a source material? There need to be some tax incentives or other government support for these types of industries rather than punitive measures. Also government needs to provide more assistance to cover capitalization cost.
	Governments need to be putting more emphasis on market development. And you should be legislating a User Pay system.
Notes Taken at an Information Session on Waste Diversion in the Greater Toronto Area, Tuesday, July 21, 1992, Community Information Centre, Sutton	Should look at what is happening with waste diversion solutions in other countries.
	Bureaucratic approvals processes are working against the development of large scale 3Rs facilities.
	Government should provide incentives to industry in 3R solutions and support markets for 3R materials.
	Governments should build recycling factories instead of landfills.
	There should be source separation, as well as separation at landfills to assist in reaching diversion targets.
	People in Toronto should be forced to reduce.
COMMENTS FROM THE SWISC PUBLIC CONSULTATION PROGRAM OCTOBER 1989 TO JUNE 1990	
	Diversion of waste from disposal should be given top priority in the development of a waste management system.
	Individuals should take more responsibility for the solid waste they generate.
	Educational programs are needed to support the waste diversion goals.
	There is a need for action (whether it be taxation, legislation or something else) to deal with the issue of excess packaging of consumer products.
	Targets set for diversion are not high enough.
	It is important to ensure that markets exist for diverted materials.
	Enforcement of targets for diversion from disposal are required.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Waste producers must take responsibility for disposing of the waste the create, perhaps through institution of a "producer-pay" system. While the survey indicates that 8 in 10 people support mandatory participation in 3Rs programs, only 37% agree with requiring householders to pay a fee for the amount of garbage put out at the curb.
	Need for more emphasis on the industrial/commercial/institutional sectors for 3Rs.
	Support for hierarchy of the 3Rs - reduce, reuse, recycle.
	Some members of the public suggest that the 3Rs Action Plan must place more emphasis on reduction at source.
	Lobby Federal and Provincial governments and manufacturers to initiate concrete solutions to the problem of overpackaging.
	Support for reusable or refillable glass containers. The results of the survey indicate that generally residents of the GTA prefer reusing glass containers through a deposit system to recycling them at the curb.
	Undertake leaf composting programs ... support these programs with a coordinated and comprehensive GTA-wide education program so the public knows how to participate.
	Need for comprehensive programs to encourage backyard composting.
	Legislation may be required in order to push recycling in the commercial and industrial sectors.
	Development of markets for end-products is critical in order to achieve diversion rates.
	Future markets can partly be developed through government policies favouring recycled products.
	Education on the 3Rs is an urgent priority and should reach all sectors of society.
	Education needs to provide practical "how to" information, but should also address the broader issue of lifestyle change.
	Support for the building of demonstration plans for recycling and composting.
METROPOLITAN TORONTO WORKS DEPARTMENT - SWEAP	
Master Plan "Composting" Comments	I have a home composter. Why didn't someone point out that takes a fair amount of strength to turn over the organic waste? It is useless for me.
	I would prefer the separate wet collection to composting, especially in the winter.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Community vegetable gardening in our public park areas will provide a composting outlet for non-gardening members of the community. Crops could be contributed to the underprivileged or distributed to communities at a reduced cost.
	My composter is attracting rats.
	Don't have neighbourhood compost collection. Make people responsible for their own kitchen waste. If they see the garbage they produce, the will have to deal with it and change their habits. Right now garbage is out of sight out of mind. People will continue to jam recycling programs until you make your plan more aggressive.
	It's difficult for landscapers to wish to do the "right" thing with grass or twigs, etc. to contribute the material for centralized composting without having to pay to do it. More cooperative solutions should be made available.
	All homeowners should compost - it should be a law.
	Metro Toronto should investigate co-op composting in parks.
	How about apartment dwellers - where do they put their composters, in the bathroom? Get real! Composting is the prerogative of homeowners with gardens. What of the thousands of apartment dwellers?
	Large scale impact collection is needed, especially in the summer.
	Expand the home composting program - composting is so easy.
	I would like to see you buy restaurant composters from ECO Corp. This is a small Canadian company that really needs your business. I find that proper compost management is difficult for frail or elderly people. Some of us are just creating methane and harming the ozone.
	Compostible materials should be taken to a collection depot/truck situated at grocery stores.
	Home composting should be mandatory.
	I have read about Toronto food terminal having about 1/3 of its food it handles go to waste. What happens to this organic material? Does the plan consider trying to transport some of the organic back into the land where the food originally came from?
	By far the largest amount of my household waste is garden waste, i.e. leaves, grass, branches which cannot be disposed of using a single composting bin. Why not extend collecting garden waste (in clear plastic bags) throughout the years? Central composting has proved itself to be very popular.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Suggestion - a neighbourhood leaf shredder in the fall. The leaves could be dug into gardens. Five bags of leaves would reduce to two, or people could bring leaves to the shredder. I think many gardeners would take advantage of this.
Master Plan "Blue Box" Comments	With regards to rigid plastics being accepted into the blue box, do you mean yogurt cups and ice cream containers? I would like to see all aluminum, i.e. pie plates, etc. as well as pizza boxes included in the blue box. I would also like to see broken dishes, styrofoam and mirrors going into the blue box.
	Blue box fine paper recycling is needed. Could plastic, such as the plastic around a case of coke, be recycled? Are flyers on shiny paper recyclable? Are envelopes recyclable? Peel collects clothes for recycling. Will that be done here soon?
	The blue box program will not work until the tax system is reconstructed and the cost of recycling is included in the cost of items purchased.
	I think the beverage industry could do more to reuse containers, e.g. special taxes/refunds.
	I would like to see the addition of the rigid plastics and plastic bags and wrappings. It is almost impossible to avoid all of these plastics when purchasing food items.
	Blue box is a must for apartments, townhouses, co-ops, etc.
	Development of markets for recycled HDPE or PET.
	The blue box system is not the long-term solution and misleads the public. Rather than adding new items, spend more effort on reuse and reduction.
	To reduce costs, why doesn't the City implement at source separation for household/apartment glass, cans etc.
	Tax individuals who don't use their blue box.
	Collect newspapers once a week and food and yard waste alternately. Why is the proposed waste wood proposal by Q&O Paper taking so long to get off the ground? a) dispose of wood; b) provides electrical energy. It has been over 2 years on the books - to my knowledge - get this going.
	Could a means of recycling cereal boxes be introduced? "Everfresh" juice bottles can be returned and reused in other provinces, why not in Ontario?

**GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM
PAST WASTE MANAGEMENT STUDIES
(continued)**

Reference Document/ Source	Comment
	I feel the blue box program is a total failure, and represents the blatant misuse of public funds. It was initiated by the soft drink bottlers, an industry that should have been forced to start reusing bottles. Let's start by looking at reusing all drink bottles. Items such as newspaper, tin should of course be recycled. The blue box program should not be costing taxpayers money.
	I live in a small apartment building where we are unable to recycle because of lack of room for the bins outside the building. What sort of provisions are being considered for the large number of urban people that are in the same situation as myself? More pressure should be put on landlords (both residential and business) to plan for recycling space/ facilities in their new building projects.
	Make sure consumers have more "post consumer" recycled products available.
Master Plan "3Rs" Comments	Centres should be established now where people could deposit styrofoam trays, plastic bags and paper (other than newspaper) etc. This will create incentive for commercial recycling by creating a stockpile of these items. Don't penetrate bureaucracy.
	I agree that it is extremely important to have more public domes, as well as mandatory recycling and composting for restaurants. They produce a lot of waste which could be recycled or composted.
	Insist on having appliances repaired instead of buying new ones. Don't buy non-recyclable bottles. Reduction should begin as soon as possible.
	You are focusing far too much effort on recycling. People throw everything into the blue box because they believe that recycling solves problems. What this does is make the collectors and sorters life very difficult and inefficient. You want to add aluminum, magazines, etc. - don't be crazy! Strongly stress that consumers must drastically alter their spending habits are responsible for waste.
	People should be charged for the plastic bags they get at food stores. As a cashier, I am asked to double, even triple-bag groceries. Some people even ask for four bags.
	I don't have a car and we don't have a recycling program in our building. My small son tells me to recycle all the time but there is no depot close by. We should go back to using paper bags to store nails in etc. rather than plastic containers.
	Our management refuses to have a recycling program in our apartment building.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Metro Toronto should actively pursue better recycling facilities - let's stop spending money on useless programs and build some recycling facilities.
	Canada needs to emulate European recycling.
	Can you recycle materials without causing a health hazard, e.g. glass?
	Can styrofoam be recycled?
	Is plastic packaging recyclable?
	I heard our glass is going to the U.S. to be recycled - I don't approve.
	I would like to see more blue domes around so we don't have to travel as far to recycle stuff from our apartment.
	Why didn't they start recycling years ago? It costs three times as much. I don't believe in reducing or reusing, I believe in recycling.
	Reduce the cost of recycling drywall scrap so that people can make a living. So that we don't have illegal dumping and competitive prices of SOBs. You are ruining our profits.
	It used to be easy to find a drop box to donate things not needed. This recycled a lot of things which now go to garbage. Good Will does not take furniture any more when there are more needy people who could use cheaper furniture.
	Your reuse program sounds great but each morning when jogging, I see so much "good" garbage at the curbside. Garbage collections should refuse items that could be donated or recycled.
	The less multiple handling the more cost effective: need for trucks geared to separation on pick up and ability to dump contents into facilities which can be themselves loaded for transport to specific recycling plants. Blue Box: add magazines, rigid aluminum foil, rigid plastics and plastic bags. MRF facilities should be set up so minimum rehandling is required.
	I would like to see an environmental tax on products such as disposable diapers and non-refillable bottles and use the money to promote the 3Rs.
	Shopping centres where there are convenience stores produce a lot of waste cans, bottles, packaging. Should have receptacles for such. Recycling Co-op appears to need the market-end established.
	Ban non-returnable bottles and cans.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	I've heard rumours that soon Metro Toronto may consider stopping the Blue Box Glass Recycling Program. Apparently, there is a glut of glass. Why not maintain the program, dump the glass in piles and pulverize it with dozers. This product could then be used for covering other indisposable waste while cutting down on the bulk of unbroken bottles until another use is found for product.
	Schools could have drop boxes for paper (used on side) as well as for other reusable items.
	We have started our recycling program at our office where we recycle paper, use "Paper Option" recyclers, use mugs and not styrofoam, etc. We do the same with food, i.e. when lunches are catered, we send intact leftovers to Food Share or Second Harvest. There is a lot of food (in offices) being thrown out when it could be feeding the homeless.
	Professional gardeners must be encouraged to use clear plastic bags for garden - grass clippings instead of green bags which end up in a landfill.
	Is there a way to recycle magazines?
	Too much emphasis that has been placed on recycling has blurred the importance of reducing and reusing first.
	I presently bring the pop cans and newspapers home from work for recycling. Although this is not a problem, one of the biggest garbage areas is the office paper - what can be done with this?
	I agree that reduction is the most important of the 3Rs. Blue boxes have made people complacent about the 3Rs. They think that filling a blue box is all they have to do. We must develop new markets for recyclables.
	Tax or forbid non-returnable bottles.
	We must move towards reusable soft drink bottles - perhaps eliminate cans.
	Extend what can be recycled and encourage reuse or recycling of construction materials.
	Deposits should be put on glass bottles and refunded once returned.
	Make recycling of cardboard easier - too much of a pain.
	We follow the green consumer's guide but would like to see more informative ads on what to recycle certain products, i.e. saran wrap, household items too bad to repair, light bulbs, and old, small appliances.
	Small appliances should come with spare parts and rather than throwing away, one could repair it themselves.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Before we start collecting materials for recycling, we should establish that the facilities for recycling are in place and have a use for these materials. There seems to be tendency to collect first and end up with piles of materials we don't know what to do with, i.e. tires, newsprint, glass, etc.
	Would really appreciate if apartments/condos were included in the recycling program - easier than taking to depots.
	Keep pressure on the Liquor Control Board for refillable bottles.
	I would like fine paper to be added to Metro Toronto's recycling collection program. Since I am a student, I use a lot of computer and notebook paper and would like to have the used paper recycled.
	The 3Rs should be applied to used building materials which appear to represent a significant proportion of the garbage in the City dumps.
	Recycling programs should be designed in conjunction with the processors of the recyclable material.
	More 3Rs should be done in malls as well as in the industrial sector. The dome should recycle more than just cups.
	Emphasize patronage of Good Will, Salvation Army, etc. for reusable items (you would not believe what is thrown away - e.g. furniture, appliances, even computer equipment - at curbside. Establish community resource places like "Wastewise" in Georgetown (as both recycling centres and material exchange facilities. Make more items more "blue boxable".
	Would it not make more sense to return recyclables. It seems to me that collecting recyclables is expensive and burns a lot of energy. I'm already going to the store, why not return the recyclables there?
	Encourage builders "Do-it-your-selfers" to take solid lumber cuttings - dimension lumber to pre-arranged depots for free distribution for firewood or reuse in projects - cottages, etc.
	Reduction of waste must become as widely accepted as recycling is now.
	Bring back the reusable glass milk bottle and reduce the quantity of soft drink cans and assign deposits to remainder.
	Collect and recycle scrap metals, e.g. pots, metal pipes, etc.
	Encourage and develop recyclable sanitary products for women. Encourage by funding research recycling plants for plastics, chemicals, and construction waste.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	I want to know what Metro Toronto is doing to apprehend the environmental "criminals" in Toronto, i.e. big businesses and government. Shouldn't the emphasis be on reduce before anything else. All I see is recycle, compost, etc.
	Promote yard/garage/street sales to promote the reuse of materials.
	Move immediately to collect clothes, furniture, etc. for Goodwill. Also consider the Third-World markets for some items.
COMMENTS ON MOEE WASTE REDUCTION OFFICE INITIATIVES PAPER NO. 1	
	Consider quarterly or monthly reports to the MOE by municipalities at least for diversion quantities and value of materials.
	Perhaps it should be mandatory that all waste generators participate in the source separation program since the municipality is required to provide one.
	Consider disposal ban.
	Mainly funding and cost concerns expressed.
	Should specify that recyclables must be collected when garbage is collected or set a minimum time period within which a municipality must collect source separated materials.
	All agreed that infrastructure was in place to handle and process any amount of steel collected - it was believed that the major problem is in collection.
	White goods not economically viable for recycling.
	The existing infrastructure allows food and beverage cans to be consumed directly by the mills - all other forms of "ferrous" items will require the facilities of the scrap industry to process these articles in order to remove the non-ferrous materials. The logistics and frequency of pick up would be based on the needs of the individual municipality.
	Collection system does not exist to accommodate the other ferrous items generated.
	Steel industry can accommodate increase volume of ferrous that would result - likely to displace a portion of imported scrap.
	Avoid any regulations with regard to flow control of source separated materials.
	Infrastructure exists to handle increased volumes of aluminum - improvement needed in collection systems.
	Suggestion that UBCs and food cans be collected by the Blue Box with other aluminum products being collected by the municipality on special pick up days or being dropped off by residents at special sites.

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES
(continued)

Reference Document/ Source	Comment
	Comment that municipal source separation should be in place before ICI program so that they can work together.
	Can the province cease to provide funding if the company ceases to recycle.
	Guidelines for source separation are needed especially with respect to what it is in terms of selected recyclable materials and to what extent it should be carried out.
	Concern on marketability of compost.
	People should be encouraged to leave grass clippings on the lawn - this is consistent with the 3Rs hierarchy which stresses reduction over reuse and recycling.
	Why aren't ICI businesses with large properties producing a significant amount of leaf and yard waste being required to compost.
	Why not give grants to persons/companies that reach the targets i.e. incentives or disincentives.
	Problems exist with existing composting sites in terms of cost and pick up.
	Should encourage backyard composting of household leaf and yard waste.
	Should consider the fact that municipalities with less dense populations may not be able to implement recycling infrastructures as conveniently as those with more dense population bases.
	Budget implications - taxpayers are reaching the limit of what they can afford to pay in taxes.
	Education, training of staff and enforcement may be beyond the financial and staff capabilities of the smaller municipalities.
	Rural townships may not be able to afford the composting systems which the MOE is suggesting - this may be a particularly unnecessary hardship if the municipality's residents are already using alternate means of organic waste disposal.
	Incentives such as high tipping fees and low cost recycling tipping fees are perhaps as useful as audits and workplans as business people will practice the 3Rs given the financial incentive to do so.
	Perhaps require greater market development for the materials we currently recycle before we consider expanding the blue box to include additional materials.

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Reference Document/ Source	Comment
	Given that composting of organic waste presents a better alternative than landfilling it, and that whatever contamination exists in the waste would reach the environment in any case, there will be no undue restrictions imposed on composting or the end use of composted material.
	The economic viability of a sustainable 3Rs program is based on 4 principal factors: disposal cost avoidance, availability of markets/material quality, market pricing for materials, recovery costs to separate, collect and sort.
	Concerned that regulating additional materials into blue box could result in unreasonable additional collection and processing charges by contractors for municipalities under existing programs.
	In some instances it makes more sense to chip the woody material and use it in chip form rather than composting it.
	Financial impacts to municipalities and the ICI sector must be included - must not be treated as an afterthought.
	Residents should be encouraged to do their own backyard composting - central composting is not cheap.
	The multi-material recycling site is limited in the materials it would accept. There would appear to be no opportunity for recycling of other materials as technology or markets develop.
	Favour the voluntary approach of NAPP. Suggest that the ICI sector is given guidelines for waste minimization with regulations as a backdrop which could be enacted through enabling legislation as necessary.
	Should give consideration to legislation to increase the level of recovery of recyclables in both existing and future residential blue box schemes, either by compulsory source separation or by legislating pay by the unit, rather than flat rate system.
	This person has proposed an alternative program including the following components: - landfill bans especially on one way and disposable items and certain types of packaging - source separation should take on a Wet/Dry approach with a companion HHW program - manual sorting at MRFs to be done by welfare and unemployment insurance recipients - those recyclables which are presently difficult to market can be stored at a "monolandfill" until they can be used

GTA 3Rs ANALYSIS EA
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	- a change in the tax structure that would favour recycling industries and recycled materials over virgin ones - municipalities should be required to establish community reuse centres to accept potentially reusable goods and to repair items - individuals could take any items they can use.
	Land application of leaves should be considered as an alternative to a composting program providing a more economical and desirable method for recycling of leaves. This application may well fit in to the same method for the disposal of yard waste.
	The MOE should place more emphasis on establishing markets, developing the financial and technical systems to direct materials to a productive use, and implementing public education programs.
	All municipalities should be required to implement source separation and leaf and yard material composting.
	There needs to be increased emphasis on market development and funding should match that emphasis.
	There should be serious efforts to make the system reflect the true costs of various commercial and industrial practices and to try to make the economic impact bear on those that create waste/ environmental problems.
	Recommend a massive consumer education program be taken by industry and government to help consumers.
	The paper tends to focus on recycling as the key to waste reduction over the first two Rs of reduction and reuse - there should be more reduction and reuse programs implemented and the public should be educated and made aware of these programs.
	People should be encouraged to compost at home in the backyard or through vermicomposters - this would also eliminate some of the collection problems.
	Kitchen scraps should be composted - perhaps by centralized composting service for individual homeowners or at the least the MOE could promote backyard composting.
	The government should ensure that recovered recyclables maintain a reasonable market value through product stewardship programs, mandated recyclable materials content in products and incentives through financial and/or regulatory means to stimulate private sector demand for these materials including co-generation of hydro through incineration of materials with energy value which are surplus to the market demand for reprocessing through recycling.

**GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM
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(continued)**

Reference Document/ Source	Comment
	If there is no market for a source separated material it should be stored until an end user can be found.
	Aside from handling problems during pickup, is there any reason to continue excluding window glass as a source separated material?
	It is essential that viable markets and an appropriate infrastructure be in place before new wastes are added to the list of source separated materials.
	There is a definite lack of support for waste reduction. There should be at least as much emphasis as on recycling.
	The amount of money allocated to public education is too small. Money should be available for education the public about all potential waste diversion strategies: composting, reduction and consumer power in purchasing.

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Ministry of Education and Training Capital & Operating Grants Administration Branch S. Mitchell, Architect, Capital Support	This Ministry does not have any comments to make at this time other than, we wish to be kept informed of further details and proceedings as they occur.	No response required.
Ministry of Culture, Tourism and Recreation Cultural Programs Branch Archaeology and Heritage Planning Unit Winston Wong Heritage Planning Officer	We note that in Section 5.1.1 <u>Evaluation Criteria</u> under <u>System Net Effects Analysis</u> (page 11), the criteria which are categorized include: Cost, Municipal Finance, Natural Environment, Service, and Social Environment. We also note that under the Natural Environment criteria group, it is indicated that there may be impacts to "terrestrial systems and resources due to siting of materials recovery facilities (MRPs) and composting facilities". Keep in mind that the siting of these facilities may also affect possible cultural heritage resources, such as archaeological sites and heritage structures which may exist. We believe that inclusion of cultural heritage resources and the possible impacts resulting from facility siting could improve the 3Rs analysis and allow the approach to slightly be more comprehensive.	The report was revised to include the potential for impact to archaeological and heritage features within the Social Environment criteria group under the criterion "Potential Local Community Impacts". However, since the analysis was done on a generic, non-site specific basis, site specific data was not available, making it difficult to assess the potential for impacts on heritage and archaeological features.
Durham Region, Works Department V.A. Silgailis, P.Eng. Commissioner of Works	As you advised, the *Waste Management Act* requires the Ministry to provide an estimate of the quantities of waste which will be diverted through the 3Rs over the next 20 years and that this information was provided in May 1992. We are unsure why the Ministry has undertaken this additional detailed analysis. If, however, these documents are going to be used as supportive information by the Ministry at an Environmental Assessment Hearing, then the Region needs to know how these reports will be used and on what basis will the Region be required to implement any of the suggested combinations of possible 3Rs systems.	The GTA 3Rs Analysis study provides additional analysis of 3Rs activities, in support of the waste diversion estimates previously provided in May 1992. In addition, the Ministry, by administrative agreement, is providing the "alternatives to" analysis as required by the *Environmental Assessment Act* (EAA). The EAA requires a description of, and statement of rationale for, the 3Rs as well as an evaluation of 3Rs as the alternative to landfill disposal. The GTA 3Rs study is an input to the IWA's environmental assessments. The systems assessed represent an array of conceptually different alternatives that have been evaluated at a generic, non site-specific level. They are not presented as a prescription for any particular Region.
	There seems to be a number of assumptions used in the development of important statistical data that should be re-examined more closely. For example, the following assumptions are highly questionable:	
	a) That Blue Box collection costs will remain constant with an expanded list of materials.	The Cost discipline acknowledges that method has limitations. The Cost Technical Appendix explains why this methodology is used. Approach is considered appropriate for level of detail required for the analysis.

GTA 3Rs ANALYSIS COMMENTS ON NOVEMBER 1993 DRAFT DOCUMENTATION (continued)

Agency	Comment	Response
	b) That the sale of Blue Box material will remain constant with an expanded list of materials.	The Cost discipline acknowledges that method has limitations. The Cost Technical Appendix explains why this methodology is used. Approach is considered appropriate for level of detail required for the analysis.
	c) That the diversion rate of waste through the use of backyard composters will remain constant with the widespread use of composters.	Backyard composter diversion estimates take varying levels of diversion and participation into account.
	d) That garbage collection costs per tonne will remain constant with increased 3Rs participation.	The Cost discipline acknowledges that method has limitations. The Cost Technical Appendix explains why this methodology is used. Approach is considered appropriate for level of detail required for the analysis.
	The study appears to be unclear as to how much waste is actually diverted in backyard composting programs and what the resulting impact is on regular garbage collection service. These matters become important, particularly when comparisons are being made to central composting systems. Accordingly, the diversion potential and composters and the effectiveness of the various composting systems needs to be re-examined to reflect the conditions in each of the Regions.	Impacts of backyard composter usage on garbage collection were taken into account in both cost and diversion estimates. The Revised text clearly states assumptions on which backyard composter diversion estimates are based. Estimates are developed separately for each Region, and take Region-specific considerations into account. The Service Technical Appendix presents detailed estimates by Region. The Cost Technical Appendix presents number of tonnes managed by each method in each system in each Region.
	The Ministry has been aware for some time that the operation of the Region's recycling centre is labour intensive and does not use automated sorting systems. This, in conjunction with our close proximity to Metro Toronto, should suggest that our future collection and processing costs be examined very carefully. Process improvements recently initiated by the Region have changed our operations and costs quite significantly and the area municipalities may consider collection improvements in the future. In light of the ongoing economic conditions in the Province, the Ministry should review the Region's potential to divert waste as well as the anticipated future costs of Blue Box program.	The study team is aware that Blue Box processing costs for Region of Durham are high. Data were not available at the time of writing (April 1994) on the cost impacts of improvements at the Durham MRF. Because of uncertainty regarding future plans, assumptions on future cost and operating efficiencies were not made for this analysis.

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	There seems to be some misunderstanding in the reports when User Pay systems are described as Direct Cost. Normally, direct costs are applied to all systems, as a means of identifying financial costs. This needs further review by the Ministry in order to provide a consistent basis on which to compare operating systems. The User Pay scenarios should probably be added as additional financial options that are available to all waste diversion systems.	The objective of the Direct Cost system is to provide an economic incentive to residents to make maximum use of source separation and diversion methods which are available in the Existing/Committed system at no direct charge to the householder. It involves a fee for single-family residents for garbage disposal in a pay-by-the-bag or tag system. For the GTA analysis, it was assumed that a cost of $1.00 per bag/tag (close to the actual cost of garbage management) would be implemented. This scenario was assessed by all disciplines in the GTA 3Rs Analysis.
	The calculations presented for the anticipated capital and operating costs for the future systems requires further review. The cost to construct a new MRF seems too high as compared to a recent study undertaken by one of our consultants, anticipated tonnes of diverted material seems too high as compared to actual experiences, and, no consideration seems to have been given to any improvements that might occur to make the Region's collection and processing systems more efficient.	Anticipated capital costs have been revised. Improvements which might improve efficiency of the existing system were beyond the scope of this study.
	The Region is disappointed that so little time was actually spent with regional and area municipal staff to review and comment on the ongoing progress of the Ministry's analysis reports. It seems that many components have been finalized without the regular benefit and input from experienced staff who operate these types of programs in the Region of Durham.	The study team contacted a number of Regional and local municipality staff during the study. In addition, one meeting was held in June 1993 to present the draft study estimates for Region of Durham.
	There is a concern in the Region that the Ministry and IWA have not recognized the desirability to combine all the important features of the waste management system in one properly developed and structured site location. It would appear to make more economic sense, in some regional areas, to direct all municipal solid waste garbage and municipal waste diversion materials to one facility, and thus avoid the expense to develop separate operating facilities. Perhaps consideration for this type of innovation could be examined in the Region of Durham.	IWA has responsibility only for the disposal component. The GTA 3Rs Analysis provides a menu of diversion components and systems which can be combined in a variety of ways to reflect region-specific requirements.

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	The impact of provincial funding grants for the maintenance and operation of existing or future recycling programs needs to be constantly reviewed. The achievement of the 25% waste reduction goal by 1992 required a sizeable financial commitment from the province and the participating municipalities. The next provincial goal of 50% by the year 2000 will require even larger funding commitments by the Province, industry and municipalities.	The WRO of MOEE is examining a range of options for the future funding of the 3Rs.
Metropolitan Works Department G.A. Kelly, P.Eng. Director, Solid Waste Management Division	<u>Section 4.1.2 Municipal Finance (Table 4.2, pg. 4-4)</u> Table 4.2 states $196,195,000 was spent on solid waste management in Metro Toronto in 1990. However, our 1990 annual report (attached) indicates that total expenditures, including capital financing, were approximately $128,000,000. This discrepancy should be examined.	Comment noted. These figures have been updated to 1992 figures.
	<u>Section 5.3.2.1 Metro Toronto - Existing/Committed Residential 3Rs System Overview</u> The second sentence in the first paragraph should read... "As of October 1994, fine paper, pizza boxes, "gable top" polycoat cartons and boxboard will be added to programs in Metro. This is estimated to divert an additional 10,000 per year through the Blue Box program. The second paragraph should read "A Request for Proposal is being considered which may allow Metro to utilize capacity at an existing privately or publicly owned MRF, or allow private industry to design, construct, finance and operate a Metro-owned MRF. This second MRF is required to allow Blue Box materials to be collected in a commingled state from all six municipalities". Reference to construction of Recycling Centre #3 and to construction of a centralized composting facility should be deleted. The 1994-1998 Capital Works Program does not include either facility.	Text revised to add comments. Text revised to add comments. Text revised to address comment.
	<u>Sections 5.3.2.2 and 5.3.2.4</u> These sections should be revised in accordance with the enclosed Capital Works Program for 1994-1998.	Text revised to reflect 1994-1998 capital budget.

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	Section 8.3.2 Metro Toronto Systems Evaluation All costs associated with System 2 Existing/Committed should be revised to reflect the most recent Capital Works Program.	Text revised to reflect 1994-1998 capital budget.
	Service Technical Appendix Section 4.5.2 Metro Existing/Committed System All capital costs should be amended to reflect the most recent Capital Budget Report.	Text revised to incorporate most recent capital budget data.
	Service Technical Appendix Section 7.3.2 Residential Systems for Metro Toronto On page 7-12 it is indicated that the highest overall system ranking for Metro is System 4 - Expanded Blue Box. However, in Table 8.18 titled "Summary of Diversion Data for Combination of Residential and IC&I Systems: Metro Toronto, "the Expanded Blue Box System is estimated to achieve a maximum total diversion between 45-49% by the year 2015, based on existing/committed initiatives. This falls short of the provincial target of 50% diversion by the year 2000. It should be noted that many of the committed initiatives have been deleted from the Capital Works Program for the next five years, which may impact the projected total diversion figures provided in the report.	Diversion estimates have been revised.
City of Mississauga A.E. Mcdonald, P.Eng., Commissioner of Transportation and Works	We trust the MOEE and the IWA will take the following points into consideration in the final analysis of the above mentioned study: 1. The impact of the recently approved Provincial 3Rs regulations on municipalities in the GTA. These requirements will affect municipalities' waste management programs and their overall waste management strategies for the future.	Revised text has taken this into consideration.
	2. Since the report was written, tipping fees in the GTA have decreased and may further be reduced in the future. Reduced tipping fees will affect the amount of waste going to the U.S. In addition, the economic initiative for private sector companies to implement and maintain sustainable recycling programs, will also be influenced.	Revised report addresses some of the impacts of changes in tipping fees.

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	3. In the study, the expanded Quinte Blue Box Program has been used as a benchmark to forecast Blue Box waste diversion tonnages for the GTA. Results and findings from similar pilot programs conducted in the City of Mississauga have proven different in comparison to Quinte's results. Due to the difference in social and economical demographics between urban centres and rural towns, caution should be used in extrapolating Quinte's findings over the GTA.	Mississauga data have been reviewed in preparation of the final report.
	4. The City of Mississauga has recently completed an extensive composting pilot demonstration project. A executive summary report has been publicly released containing conclusions and recommendations on organic waste collection. Detailed comprehensive technical appendices will be released in early April which will contain more information and data on this project. The study focuses on curbside collection of organics and the impact of backyard composting programs. Your study team may find this information and data helpful when finalizing the report.	Data from Mississauga have been used to revise diversion and cost estimates.
City of Toronto Public Works and the Environment Nicholas Vardin City Engineer and Commissioner	I have reviewed the sections of the GTA 3Rs Analysis that deal with industrial, commercial and institutional (IC&I) wastes. I have no comment on this analysis, as I am not responsible for the management of the IC&I wastes collected by the private sector in the City of Toronto. However, I am responsible for the collection of approximately 75,000 tonnes/year of IC&I waste, and 6,200 tonnes/year of IC&I recyclable materials, principally from institutions, restaurants and small commercial establishments, which I deliver to Metropolitan Toronto facilities. I also deliver approximately 3,000 tonnes/year of IC&I fibre to a private recycling facility. You should ensure that these wastes and recyclable materials are properly categorized in your analysis. The report, as published, does not provide detail which shows that these wastes and materials have been categorized correctly.	Comment has been added to Service Technical Appendix, Schedule O on IC&I waste. Comment noted.

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Concrete Restoration Association of Ontario Harry Hakomaki, President	First, we have found consultation with the government to be a somewhat meaningless process.	Comment noted. The GTA 3Rs Analysis has taken public comments into account in a variety of ways, as described in Chapter 3 of the EA Input Document.
	Second, while we appreciate the need to recycle, reduce and reuse waste, the practicality and cost of these undertakings in a high-rise renovation project are daunting. As you are aware, the cost of doing business in Ontario has increased dramatically during the past ten years and continues to do so.	Comment noted.
	Increasing government regulation such as that which you are proposing contributes significantly to such costs.	Comment noted.
	On that basis alone, we think all new government "reforms" should be approached in manageable and affordable basis. To do otherwise, just increases costs and jeopardizes jobs.	Comment noted.
The Composting Council of Canada Dr. Peter Meyboom, Executive Director	We believe it is critical to consider centralized composting in a system involving Existing/Committed, Blue Box and Exiting home composting system (about 30% household coverage). Most municipalities in the GTA have already added the Blue Box materials that are required under the new Regulations and have promoted home composting to a wide audience (e.g. Region of Peel). Therefore, it is logical to evaluate a Residential System that holds recycling and home composting at current levels and then maximizes diversion through centralized composting.	Diversion and cost impacts of this system will be estimated, upon receipt of information from the Composting Council as discussed in a meeting on April 13, 1994.
	The same situation exists with the IC&I systems. Organics from hospitals, restaurants, grocery stores, etc. are targeted for recovery in a system, that is entitled "Expanded 3Rs Regulations with Organics". Once again, organics are added to an already expanded system.	Comment noted. Diversion impacts of adding mandatory separation of IC&I organics to any system is about 6.5% of the waste stream depending on the coverage of the regulations and compliance.
	We recommend that an additional Residential System be added into the examination. The system could be called "Expanded Centralized Composting".	See first response.
	We recommended that an additional IC&I system be added into the examination. The system could be called either "Existing/Committed with Organics" or "Extended 3Rs Regulations with Organics".	Comment noted. Diversion impacts of adding mandatory separation of IC&I organics to any system is about 6.5% of the waste stream depending on the coverage of the regulations and compliance. Comment can be added to the text to address this concern.

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	We recommend that Schedule B, "Residential Wet/Dry" be expanded to include the results of the latest pilot project experiences in Ontario (and elsewhere in Canada). This will clearly illustrate to the reviewers the number of projects that have recently been completed or are underway.	Residential Wet/Dry schedule has been expanded to include available data on Wet/Dry programs in Lemsterland, Holland; Gold River, B.C.; Prince County, PEI; St. Thomas, Ontario; and Giessen, West Germany, and the pilot project in Markham, Ontario. Additional relevant material will be incorporated if supplied within allowed schedule.
	We recommend that "city-wide" examples from other jurisdictions be added to illustrate to the reviewers that full-scale centralized composting projects are in operation. Some of these programs have been in operation for more than 20 years, long before recycling became a "household name".	New schedule has been developed to address leaf and yard waste collection and composting programs. Composting Council to provide information on "city-wide" examples for incorporation into text.
	Many of the assumptions used to develop the costs used in the report are not listed, which makes it difficult to interpret the numbers as shown. For example, some basic assumptions that appear to be used which are suspect include: · Blue Box collection costs will remain constant with an expanded list of materials · Revenues from the same of Blue Box materials will remain constant with an expanded list of materials · Diversion rate from backyard composting units will remain constant under a widespread distribution program · Garbage collection costs per tonne will remain constant under a large scale diversion system	See response to Region of Durham comments (same issues raised).
	In general, there does not appear to be a clear understanding of how to apply current costs to future programs and, vice versa, the impact of changes in program structures on program costs. This problem with the report is complicated by the fact that different diversion estimates are used under different programs in different options.	Limitations of approach are clearly stated in the Cost Technical Appendix. Assumptions regarding future program costs are less certain than using known, measured costs. The latter approach was used in the analysis for reasons outlined in the text.
R. Cave and Associates Engineering Ltd. R. Cave, P.Eng.	It is assumed that the goal of the systems is to meet the Province's 50% diversion target. Why are systems considered which do not meet this goal and why are they analyzed in detail throughout the reports?	Goal of systems was not necessarily to meet 50% diversion. A range of systems with a range of diversion potential was assessed.

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(continued)

Agency	Comment	Response
	System 3 - Direct Cost, or User Pay, is not a specific system but an alternative method of recovering the cost of any waste management system components. This type of approach is applicable to any system and therefore should not be treated as a separate system but a policy applicable to any system. Therefore, I did not consider this realistic in my review.	The purpose of the Direct Cost System in the GTA 3Rs Analysis was to provide an economic incentive to residents to maximize use of available diversion options which are provided to the households at no charge. This system endeavours to maximize recovery through the existing infrastructure and level of service and is considered a realistic option. Many smaller Ontario municipalities, and US communities of all sizes have adopted this approach.
	System 4 - Expanded Blue Box does not meet the goal unless the capture rates increase substantially and in most cases double. How can one say this increase is proven? Even with significant and effective education and promotional campaigns in the GTA by municipalities, MOEE, OMMRI and numerous other partners the best capture rate was less than 70%. To use the Quinte experiment clearly skews analysis and results, since the demographics, population, geographic extent are not comparable with the GTA situation. It is not necessary to include all alternatives, just reasonable alternatives - clearly Quinte is not relevant to the size of our problem. To compound the error, this system also includes the assumption that backyard composters will be distributed to 80% of the SFHs and the public will use them to divert 100 kg per year of food and yard wastes. Where are diversion rates on this scale occurring in large densely populated urban areas?	A pilot project carried out in Mississauga has measured diversion rates through backyard composters that are used in the GTA study. Quinte recovery data per household are similar to Edmonton data, but Quinte provides a greater level of detail on a material by material basis. Therefore, overall recovery data similar to Quinte have been measured in other programs.
	System 5 - Wet/Dry separation and processing appears to exceed the goals. Why then have the consultants ignored 3 years of data from the City of Guelph and detailed waste composition analysis? In the analysis, the costs of the Wet/Dry system include costs of roll-out carts, these are not necessary for a Wet/Dry system. If one wants to consider collection container costs then the analysis should include the costs of bags and blue boxes used in the other systems. For this reason the Wet/Dry economics as presented cannot be compared as an alternative system since basic assumptions are not consistent with the other systems.	Guelph data have not been ignored in the analysis. It is considered along with data from a number of other programs. MOEE considers 2-stream collection to contravene current policy in terms of source separation, therefore a 3-stream system was analyzed. Cart based systems perform well in case studies reviewed, therefore a cart based system was used for analysis. The study team acknowledges that there are many Wet/Dry system designs that could be considered.
	There have been a number of pilot programs in the province to test the feasibility of this system - funded by the MOEE - and this information has been ignored.	None of the MOEE funded project information has been ignored. It is considered along with the other data available to evaluate the Wet/Dry system approach.

GTA 3Rs ANALYSIS COMMENTS ON NOVEMBER 1993 DRAFT DOCUMENTATION (continued)

Agency	Comment	Response
	Other costs for composting options are also based on incomplete systems or an inappropriate level of technology for the application. There are many composting facilities in North America with preprocessing, which could be used for reference, but are not, why?	Composting costs have been updated.
	System 6 - Mixed Waste Processing has been a demonstrated failure in the past - if this meets the definition of "proven" then I wonder what "proven" actually means. Firstly, the recovery of marketable materials such as newspapers, cans, etc. from such a process has not been successful. Secondly, processing mixed waste to recover compost has also been a failure at many facilities due to unacceptably high levels of metals and inorganic contaminants in the finished compost. The Province's own Experimental Plant for Resource Recovery proved this in the 70s. The only purpose of this process would be to reduce the organic content and volume of the waste prior to disposal of it in a landfill site and is therefore not a 3Rs alternative. The only diversion from disposal would be the reduction in the volume as a result of the decomposition of the organics. The estimated diversion rates for System 6 are therefore inaccurate.	The study team has acknowledged throughout the report text that mixed waste processing and composting has met with mixed success to date, but many mixed waste plants are in operation in the US. This is considered an option which should be evaluated because of its ability to divert high quantities of waste if successfully operated.
	The quoted costs of collection for Wet/Dry is over stated. In terms of social acceptance, the Wet/Dry system ranked low because the elderly had difficulty in wheeling the bins to the curb - the same argument holds for the use of the Existing Blue Box. who said you had to have bins with a Wet/Dry system?	Collection costs of $77/tonne have been used in revised estimates. Cart based systems have proven successful at pilot and full scale (St. Thomas, PEI, Lemsterland), and are considered an appropriate assumption for preliminary system assessment.
	In the report there was no discussion of centralized composting of food and yard wastes, why? Mixed Waste Processing is not what is proposed at Guelph or in Kingston, or in London, or in Newmarket, or in Pickering, or in Halton. These facilities will process source separated organic wastes or "wet wastes", they will not accept mixed municipal wastes. Why, because the Ministry considers backyard composting is good enough and again is, in my opinion, over estimating the potential diversion.	Separate text on central composting was not developed, as proven collection and processing technologies were not discussed in detail (the same applied to MRFs and open windrow leaf and yard waste composting).

GTA 3Rs ANALYSIS COMMENTS ON NOVEMBER 1993 DRAFT DOCUMENTATION (continued)

Agency	Comment	Response
	The waste management system in GTA should be an integrated system designed to maximize the diversion of waste from the landfill alternative, minimize the potential environmental effects of the wastes being disposed, all done at minimum cost to the taxpayer.	Comment noted.
	No discussion in the report and no economic analysis of the cost saving potential for various forms of co-collection.	Schedule will be developed (if time permits).
	Finally, **centralized composting**, this should be a major consideration in the system. Backyard composting, if it ever achieves the rates proposed in the report, still only diverts a portion of the organics from disposal. Yet organics cause significant problems with the operation of landfills, leachate, odour, methane gas production, yet System 4 has over 50% of the organics being buried in landfills. Central composting sites have caused odours, so have landfill sites, but composting facilities can be built and operated in such a way to guarantee that odours are treated.	Centralized composting is a core component of System 5 - Wet/Dry, and is assessed as part of this system, which integrates 3-stream collection of household waste with centralized composting of source separated household organics.
City of Scarborough Works and Environment Department R.J. Gordon, Director Sanitation Services	It appears that the fiscal impact of any further expansion or development strategies has not been adequately reviewed or analyzed in this report. The impact of waste reduction legislation and directives to our local taxpayers is of paramount importance, especially in this time of fiscal restraint.	The GTA 3Rs Analysis is generic in nature. It is the municipalities themselves which will need to implement the preferred waste diversion system, taking into account specific municipal circumstances and issues.
	This report does not adequately analyze the main concern to municipalities - that of collection costs incurred by service expansion. It is staff's position that without provincial and industrial commitment to a proper funding model, one which recognizes the full costs of collection and the impact of volume as well as tonnage, that any significant expansion of collection services is premature and may place an unfair burden on Scarborough taxpayers.	The analysis was done on a generic, non-site specific basis. Any system that would be implemented would have to take into consideration local concerns.
Town of Markham William Hell, Director of Parks Construction and Maintenance	The report is an excellent overview of existing and proposed methods of diversion. The diagnosis for the future is not overly optimistic, in fact, it is an achievable goal based on our own past experience. Markham achieved a 29% reduction in solid waste in 1991, one year ahead and 4% higher than the provincial mandate of 25% by 1992.	Comment noted.
City of Mississauga Rob Rivers, Recycling Co-ordinator (Telephone comment)	Data upgrade - information provided on wet/dry and backyard composting pilot results and system costs are available.	Comments reflected in text.

GTA 3Rs ANALYSIS
COMMENTS ON NOVEMBER 1993
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(continued)

Agency	Comment	Response
Region of Durham Peter Watson, Manager of Works (Telephone comment)	Data upgrade - information provided on unit cost, blue box processing and yard waste processing. Concern re: original data in report, major processing changes occurred in February and not yet fully realized (impact not yet certain). Provided new data on yard waste processing.	Comments reflected in text.
Region of Peel Glen Williams (Telephone comment)	Data upgrade. Should have combined Direct Cost with other system components (e.g. wet/dry). Concern that capture rates may be high.	Text revised to reflect comments. Systems developed to present array of alternatives for analysis. Comments considered in text revisions.
Town of Georgina Joanne Carr (Telephone comment)	Data upgrade. Recyclables in Georgina are not processed in a new Georgina MRF by LaRue's Haulage.	Text revised to reflect comments, although due to late arrival of information (April 20), complete analysis could not be conducted.
Ontario Environment Network Waste Caucus Brooke Bell (Telephone comment)	Waste composition should come from modelling.	A wide range of waste composition studies were taken into account in developing waste composition for the GTA.
	Some areas create very little waste.	Comment noted.
	Concerned with the public consultation program. What were the objectives?	The initial stages of the public consultation program focused on reviewing the results of previous consultation programs which dealt with waste diversion in the GTA. The Stage 3 consultation program focused on the review of the November 1993 draft documentation. As described in Chapter 3.0 of the EA Input Document, various opportunities were available to the agencies and the public to provide input.